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TACTICAL NUCLEAR WEAPONS - DOES THE U.S. ARMY STILL NEED THEM?

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Many critics of tactical nuclear weapons believe that the dramatically increased lethality and accuracy of conventional weapons systems are an adequate replacement for tactical nuclear weapons, achieving the desired results without the political consequences that many attach to the use of nuclear weapons. The U.S. Military'sexperiences in Desert Storm has provided fuel for both sides of this argument. Additionally, technology continues to improve the capability to tailor the effects of low-yield nuclear weapons to achieve the desired destructive results without the associated collateral damage.
This paper will examine the following questions;

1. Do conventional 'smart' munitions provide an acceptable substitute for TNWs, or are small low-yield 'micro-nukes' and 'mini-nukes' the superior option?
2. Do the potential threat countries have sufficient WMD capability to warrant resurrection of the Army's tactical nuclear program?
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CHAPTER 1

INTRODUCTION

On September 21, 1991, President Bush moved unilaterally to "de-nuclearize" the United States Army completely, and the U.S. Military Forces dramatically, perhaps ending a struggle for dominance between conventional and nuclear forces in favor of the former. The Bush disarmament initiative called for the withdrawal and elimination of U.S. tactical nuclear weapons from around the globe. The Army's nuclear stockpile of 850 Lance missiles and some 1,300 artillery-fired atomic projectiles (AFAP) were withdrawn from service. The U.S. Navy saw its nuclear-armed Tomahawk cruise missiles, B57 and B61 nuclear gravity bombs, and nuclear depth charges removed from its ships and placed in storage.[1] Following decisions made after the 1995 Nuclear Posture Review, only the U.S. Air Force retained a capability to deliver tactical nuclear weapons in support of operations.[2] These cuts were met with reciprocal promises from the Soviet Union which pledged to withdraw and destroy all ground-based tactical nuclear weapons (TNWs) and remove sea-based TNWs from all ships and submarines in peacetime.[3]

Many critics of tactical nuclear weapons believe that the dramatically increased lethality and accuracy of conventional weapons systems are an adequate replacement for tactical nuclear weapons, achieving the desired results without the political consequences that many attach to the use of nuclear weapons. The U.S. Military's experiences in Desert Storm has provided fuel for both sides of this argument.[4]

Additionally, technology continues to improve the capability to tailor the effects of low-yield nuclear weapons to achieve the desired destructive results without the associated collateral damage. 'Mininukes' and 'Micronukes' are still being designed researched in an effort to

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1 COL Emmett E. Stobbs Jr., "Tactical Nuclear Weapons: Do They Have a Role in U.S. Military Strategy?" Comparative Strategy, Vol. 13., pp. 197-209.
2 William Perry, Annual Report to the President and the Congress, Office of the Secretary of Defense, Washington D.C., USGPO, February 1995, p. 89.
3 Jeffrey R. Smith, "Cheney Open to Bomb Storage," Washington Post, October 16, 1991, p. 30.
4 See MAJ Robert H. Vokac, Smart Weapons - Can We Fold The Nuclear Umbrella?, A monograph submitted to the School of Advanced Military Studies, U.S. Army Command and General Staff College, Fort Leavenworth, KS, December 31, 1991.

provide "a credible option to counter the employment of nuclear weapons by Third World nations."[5]

China and Russia still retain TNWs, North Korea is still a menace to our South Korean allies, and the Iraqis, Iranians, and Syrians continue to vie for dominance in the Middle East. What are the future threats to the United States interests that might require it to equip its army with tactical nuclear weapons?

This paper will briefly chart the history the conventional vs. nuclear forces debate, and then examine the following questions;

1. Do conventional 'smart' munitions provide an acceptable substitute for TNWs, or are small low-yield 'micro-nukes' and 'mini-nukes' the superior option?

2. Do the potential threat countries have sufficient WMD capability to warrant resurrection of the Army's tactical nuclear program?

3. Can the Army rely on the Air Force to provide for its TNW support, or does it require its own capabilities? Additionally, can the Army expect that its political leadership will allow it the option of nuclear weapons to support tactical operations?

5 Ruth Sinai, "Labs' Research Targets Low-Fallout 'Mininukes'," Contra Costa Times, Contra Costa, CA, June 17, 1993, p. 19A.

DEFINITIONS

TACTICAL NUCLEAR WEAPONS:

Tactical Nuclear Weapons (TNWs) are "Battlefield nuclear weapons, for battlefield use, and with deployment, ranges, and yields consistent with such use and confined essentially in each respect to the area of localized military operations."[6] Although specific yields are not normally ascribed to TNWs as it is their use which defines the weapon, not its technical characteristics, some have offered the range for TNW yield as being between 5 to 20 kt.[7] However, yields of a fraction to 5 kt are more practical for weapons intended to be integrated with other battlefield systems of fire and maneuver, ie. battlefield use. The primary reason for this is the "radius of safety" for friendly forces associated with yields higher than 5 kt. The radius of safety is analogous to the "danger close" of conventional artillery and close air support weapons. The radius of safety for a 5 kt weapon is 5.9 km, basically, a mechanized infantry battalion sector in the offense.[8]

ADVANCED CONVENTIONAL WEAPONS:

Advanced Conventional Weapons (ACWs) also known as "Smart Weapons," are any of a growing family of weapons that utilize conventional explosives and new, advanced means of delivery, target acquisition, and tracking to accurately and reliably reach and destroy the target.[9] ACW are divided into three categories;
precision-guided munitions, smart weapons, and brilliant weapons.

PRECISION-GUIDED MUNITIONS:

Precision-guided munitions (PGMs) generally refer to a "bomb or missile that is guided during its terminal phase."[10] PGMs require an operator "to search for, locate, and then guide the munition to the target, either by 'painting' the target with a laser beam, or by guiding the round to the target by wire. These munitions are considered 'one on one' in that one round kills one target."[11] PGMs allow for the precise selection of targets for destruction on a congested battlefield, employing the weapons with ultimate efficiency.

Examples of PGMs include; the Army Tube-launched, Optically-tracked, Wire-guided (TOW) anti-tank missile (ATGM), and the air-delivered Infra-Red homing version of the Maverick missile. The TOW requires the operator to track the target until impact, while the I-R Maverick can ride a laser beam aimed at the target and controlled by the pilot or a soldier on the

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6 Dr. William R. Van Cleave and Samuel T. Cohen, Tactical Nuclear Weapons: An Examination of the Issues, New York, Crane Russak and Company, Inc., 1976, p. 15.
7 Chong-Pin Lin, China's Nuclear Weapons Strategy, Lexington MA, Lexington Books, 1988, p. 76.
8 Combined Arms and Services Staff School, Combined Arms Operations, Volume Two of Four Volumes, US Army Command and General Staff College, Fort Leavenworth KS, February 1987, pp. 91 and 92.
9 A "Dumb Weapon" by comparison is one that cannot be controlled once it has been fired at the target, requiring precise aiming before operation.
10 James Digby, Precision-Guided Weapons, Adelphi Paper No. 118, London, 1975, p. 1.
11 MAJ Robert H. Vokac, Smart Weapons - Can We Fold The Nuclear Umbrella?, A Monograph submitted to the School of Advanced Military Studies, US Army Command and General Staff College, Fort Leavenworth KS, 31 December 1991, p. 26.

ground. The television camera self-guiding version of the Maverick is an improvement in that it is a "fire and forget" system which homes in on the target after the pilot acquires it and fixes the Maverick's camera lens on it.

SMART MUNITIONS:

"Smart munitions...are targeted without the aid of a forward observer to guide the munition during its terminal flight."[12] These munitions are considered "many on many" weapons which have the advantage of autonomous target selection and an ability to engage multiple targets simultaneously by deploying sub-munitions from each launch platform (either an ATACMS, MLRS, 155mm artillery, or Cluster Bomb Unit (CBU) from an aircraft). Smart munitions do not require a forward observer to "paint" the target, but some kind of intelligence collection is necessary to verify the location of the intended target before firing the munitions. This intelligence could come from un-manned aerial vehicles (UAVs), forward scouts or observation posts, airborne sensors (eg. JSTARS), or remote ground sensors.

An example of a Smart Munitions is the Sense and Destroy Armor (SADARM), sub-munition (still in the engineering and manufacturing development (EMD) phase), which is delivered by artillery or missiles above the target area. Each sub-munition SADARM is slowed by a tail-deployed parachute until the round acquires a target, at which time the sub-munition's rocket motor ignites, sending an explosively formed penetrator through the top of the armored target.[13]

BRILLIANT MUNITIONS:

"Brilliant munitions...combine the autonomous operation of smart munitions with enhanced navigation and target classification and identification capabilities."[14] Brilliant munitions will be able to discriminately identify targets such as tanks against a background of competing similar signatures such as a Volkswagen automobile, and destroy targets autonomously. Brilliant weapons, having an independent target acquisition capability, do not require the forward presence of soldiers to guide the munitions to the intended targets and allow for deep strikes.

The Army's Brilliant Anti-Tank weapon is still in the EMD phase of development. This sub-munition designed for the ATACMS missile, is self-guiding, using acoustic and infra-red sensors to autonomously locate, and selectively destroy moving tanks and other vehicles.[15] Future "brilliant" weapons being developed will feature multi-purpose programmable warheads, in-flight reprogramming, an ability to loiter over the battlefield, stealth characteristics, and non-lethal means of equipment destruction such as embrittling agents.[16]

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12 MAJ Robert H. Vokac, op. cit., p. 26.

13 Office of the Assistant Secretary of the Army (OASA), Weapons Systems: United States Army 1995, Washington D.C., USGPO, 1995, p. 151. See also, John R. Holland, Major (US Army), "SADARM Success," Field Artillery, October 1994, p. 35.

14 "Smart Weapons," Appendix 1 to Advance Sheet, Meeting 4, "Fundamentals of Smart Weapons," A304-4, Fort Leavenworth KS, US Army Command and General Staff College, p. 72, cited in MAJ Vokac, p. 27.

15 Office of the Assistant Secretary of the Army, p. 139.

16 BG Leo J. Baxter, "Field Artillery Vision 2020," Field Artillery, December 1994, p. 14.

BACKGROUND

Nuclear weapons were considered for tactical use at their inception by U.S. military leaders preparing for the invasion of Japan. Admiral Conolly requested six of them to support the planned 1 November 1945 invasion of Kyushu, after the world witnessed its devastating power over Hiroshima.[17] As the new confrontation of the Cold War emerged, a series of studies were held beginning in 1948 at the California Institute of Technology (Project VISTA) and Johns Hopkins University (Project Attack) to study the military problems that would confront NATO in the event of a Soviet attack on Western Europe.[18] The primary objective of both of these studies was the determination of the atomic weapons requirements, as well as the impact these weapons might have on organizational procedures in the defense of Central Europe against Soviet attack. In many instances, the results of the two studies are comparable.[19] Project VISTA concluded that in tactical operations, there was "a need for atomic weapons which could be delivered accurately in any weather to support ground forces."[20]

Project VISTA stressed the importance of tactical use of atomic weapons; "U.S. superiority in the production of these weapons, *particularly in the smaller sizes*, may make the difference between victory and defeat in Europe."[21]

The Army established the requirement for its own independent battlefield nuclear capability following a battlefield analysis exercise conducted at Fort Leavenworth KS in 1950.[22]

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17 See Barton J. Bernstein, "Eclipsed by Hiroshima and Nagasaki," International Security, Spring 1991, p. 163.
18 See The VISTA Report; California Institute of Technology, A Study of Ground and Air Tactical Warfare with Especial Reference to the Defense of Western Europe, Project VISTA, Final Report, Contract DA-04-495-ORD-57, 1952. See also The ATTACK Report; L. H. Rumbaugh, et al., The Tactical Employment of Atomic Weapons in Defense of Central Europe: Project ATTACK, Summary Report, ORO-R-1(EUCOM), Operations Research Office, The Johns Hopkins University, 1954.
19 Systems Planning Corporation, Tactical Warfare Studies, Final Report for the Period March 1975 - September 1975, prepared for the Director, Defense Nuclear Agency, Washington D.C., 30 September 1975, pp. 18 & 19.
20 Richard G. Hewlett and Francis Duncan, Atomic Shield 1947-1952, University Park, The Pennsylvania State University Press, 1969, p. 580, cited in Michael P. Croissant, The Tactical Nuclear Component of U.S. Nuclear Strategy: 1950s-Present, a student paper presented to the Department of Defense and Strategic Studies, Southwest Missouri State University, Springfield MO, December 8, 1993, p. 15
21 The VISTA Report, Vol 1, p. 138, quoted in David C. Elliot, "Project VISTA and Nuclear Weapons in Europe," International Security, Vol. 11, No. 1, Summer 1986, p. 169.
22 John J. Midgely Jr., Deadly Illusions, Boulder CO, Westview Press Inc., 1986, p. 10.

Dr. Oppenheimer supported the development of tactical nuclear weapons, writing in 1951; "They are not primarily weapons of totality or terror, but weapons used to give combat forces help that they would otherwise lack. They are an integral part of military operations."[23] The Army called for the use of atomic weapons to break the stalemate in the Korean War in July 1951, recommending field tests to develop a doctrine for battlefield use. General Clark, commander of the UN forces in Korea, pressed the American Joint Chiefs of Staff for authority to consider tactical use of nuclear weapons.[24]

In Europe, NATO military planners "observing that the USSR could muster as many 175 divisions against Western Europe ...concluded that the Alliance would require 96 of its own divisions - which were larger than those of the Soviet Union - in order to mount an adequate defense."[25] This estimate was accepted by the NATO ministers in January 1952 at their annual meeting in Lisbon. President Eisenhower, seeing the high costs associated with achieving the 96 divisions called for in the Lisbon force planning goals, confirmed the policy of "almost total dependence on nuclear weapons and coined the phrase 'massive retaliation'."[26]
Eisenhower, with his "New Look" policy envisioned a smaller forward deployed Army which would serve as the "tripwire" to a global nuclear exchange.[27] The Army deployed tactical nuclear weapons to Europe as an economy of force measure in lieu of expensive conventional forces.[28]

Other member nations of the Alliance were also unwilling to pay the high price to achieve the Lisbon force planning goals and deliberately turned to nuclear weapons as a an

23 J. Robert Oppenheimer, "Comments on the Military Value of the Atom," Bulletin of the Atomic Scientists, February 1951, pp. 44-45: cited in Dr. William R. Van Cleave and Dr. Samuel T. Cohen, Tactical Nuclear Weapons: An Examination of the Issues, New York, Crane Russak and Co. Inc., 1976, p. 10.
24 See Peter Hayes, The Pacific Powderkeg: American Nuclear Dilemmas in Korea, Lexington, Lexington Books, 1991, p. 11: cited in Croissant, p. 18.
25 Robert S. McNamara, "The Military Role of Nuclear Weapons: Perceptions and Misperceptions," Foreign Affairs, Vol. 62, No. 1, Fall 1983, p. 62.
26 Dennis M. Gormley, "NATO's Tactical Nuclear Option: Past Present and Future," Military Review, Vol. LIII, No. 9, September 1973, p. 6.
27 MAJ Michael D. Hess, Tactical Nuclear Warfare: U.S. Army 1945-1960, A Masters Thesis presented to the University of Kansas, Lawrence KS, 1986, p. 17.
28 LTC John D. Skelton, The Forbidden Weapon - The Employment of Army Tactical Nuclear Weapons, A monograph presented to the School of Advanced Military Studies, US Army Command and General Staff College, Fort Leavenworth KS, 9 May 1991, p. 8.

economy of force substitute for the financial and manpower sacrifices which would be necessary to mount an adequate conventional defense. During 1953-54, the United States deployed 7,000 nuclear warheads to Europe,[29] and an undisclosed number to the Asian-Pacific area.[30] These weapons included atomic demolition munitions (nuclear land mines), mortar rounds, recoilless rifle warheads (the Davy Crocket), air-delivered gravity bombs, nuclear warheads for surface-to-air missiles (Nike Zeus) and surface-to-surface missiles (Corporal, Redstone, and Honest John), and Artillery Fired Atomic Projectiles (AFAP). By 1954, as a consequence of the nuclear deployments, NATO ministers felt comfortable enough with the nuclear strategy to reduce the force level objective from 96 to 30 active divisions. Two years later, the Alliance formally adopted the policy of "massive retaliation" in a document known as MC 14/2.[31]

Within the Army, interest in TNWs rose sharply and dramatically in the 1950s. Tactical nuclear weapons were seen as "additional firepower of large magnitude," and saw their use as consistent with established procedures of fire and maneuver.[32] The Army developed a new divisional structure called the Pentomic Division designed to fully integrate the destructive power of atomic weapons with rapid maneuver. The division was so named because it was organized into five battle groups, each commanded by a colonel and consisting of five companies.[33] "The main emphasis of the Pentomic Division was on the nuclear battlefield. It was envisioned to have defensive formations in depth, with battle groups and subunits positioned in a dispersed order to withstand a nuclear attack without fatal consequences."[34] Although intended to maximize opportunities for maneuver in both the offense to seize objectives, and in the defense to prevent enemy penetrations, the Pentomic Division suffered from a lack of mobility (it had only enough organic transportation assets to move only one battle group at a

29 Christopher Campbell, Nuclear Weapons Fact Book, Novato CA, Presidio Press, 1984, p. 37, cited in MAJ Vokac, p. 8.
30 Van Cleave and Cohen, Tactical Nuclear Weapons: An Examination of the Issues, p. 1.
31 McNamara, pp. 62-63.
32 Department of the Army, Field Manual 100-5 Field Service Regulations: Operations, Washington D.C., September 1954, USGPO, p. 75.
33 LTC Skelton, p. 18.
34 MAJ Hess, p. 5.

time), strained command and control (by increasing the span of control of the commander to five sub-units), insufficient fire support, and a limited offensive punch.[35]

The tactics of the Pentomic concept favored the frontal assault, which is known to be the least desirable form of maneuver. It was believed that by using nuclear weapons, attacking forces could obliterate and overrun defenders without having to resort to time-consuming flanking maneuvers. Although the new tactics envisioned a breakthrough followed by exploitation, the Pentomic Division's lack of mobility, armor protection and speed negated its ability to effectively conduct such an operation.[36] In the end, most decided that the Army's experiment to tailor its forces to successfully fight a nuclear war were unsuccessful. The Army's efforts to develop the Pentomic organization and doctrine failed to produce a capable battlefield capability. Tests of the new division design and doctrine "rejected not only the specific design of the Pentomic division, but also the general approach to building "dual capable" divisions for nuclear and conventional environments."[37]

While the Pentomic concept did not succeed, the Army still believed that the nuclear battlefield was the most likely scenario for conflict in Europe, and continued to develop doctrine which would enable conventional forces to work in a nuclear environment.

"By 1955, 50 percent of instruction and training at the Army's Command and General Staff College (CGSC) was devoted to TNW battlefield situations."[38] Furthermore, CGSC was directed by the U.S. Continental Army Command (subsequently the Atlantic Command and now the United States Atlantic Command) to "depict atomic warfare as the typical" in its training and exercises.[39]

Advocates of tactical nuclear weapons emphasized the benefits in decreased costs, manpower requirements, and flexibility. Critics argued that nuclear war required more, not less

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35 Jonathan M. House, Toward Combined Arms Warfare: A Survey of 20th Century Tactics, Doctrine, and Organization, U.S. Army Combat Studies Institute, Fort Leavenworth KS, 1984, pp. 157 & 158.
36 COL Andrew J. Bacevich, The Pentomic Era: The U.S. Army Between Korea and Vietnam, Washington D.C., National Defense University Press, 1986, pp. 106-109.
37 Midgley, p. 18.
38 Drs. Van Cleave and Cohen, Tactical Nuclear Weapons: An Examination of the Issues, p. 5.
39 Ibid.

soldiers, and that the extensive destruction that would result from the use of nuclear detonations and the long-term radiation effects would cause significant political difficulties.[40]

As the Soviets deployed their own tactical nuclear systems in Eastern Europe at a faster rate than had been anticipated in the West - "the utility of NATO's tactical nuclear weapons began to erode."[41] The Kennedy administration began to move towards a strategy emphasizing conventional forces as the advantage confered by TNWs was erased by Soviet increases. Analysts at the Defense Department's Office of Systems Analysis and International Security Affairs staff headed by Paul Nitze found that after "eliminating paper divisions, using cost and firepower indexes, counts of combat personnel in available divisions, and number of artillery pieces, trucks, tanks, and the like...NATO and the Warsaw Pact had approximate equality on the ground."[42] Previous estimates had caused military planners to view a conventional approach as being far too costly. Subsequently the Army increased from eleven to sixteen active divisions (reaching a high of eighteen divisions in 1989); tactical fighter wings increased from sixteen to twenty-one, logistical networks and airlift capacity were expanded, and prepositioning of equipment for rapid return of forces was completed.

The doctrine of "Flexible Response" developed in the Kennedy/McNamara era was a way to reduce reliance on nuclear weapons "by fielding credible levels of conventional forces that could....be supported by firepower ranging from conventional weapons to battlefield, theater, and strategic nuclear weapons [with] each level of response represented carefully planned and controlled decisions in the escalatory process."[43] The new doctrine intended to raise the threshold of nuclear war by de-emphasizing nuclear weapons and by increasing our reliance on conventional forces and making a conventional defense more feasible.[44] Flexible Response confined nuclear weapons to only two roles in the NATO context: "deterring the Soviets'

40 Christopher Campbell, Nuclear Weapons Factbook, p. 66. Cited in MAJ Vokac, pp. 8-9.
41 Drs. Van Cleave and Cohen, Tactical Nuclear Weapons: An Examination of the Issues, pp. 50-51.
42 Gary L. Guertner, "Flexible Options in NATO Military Strategy: Deterrence or Escalation Trap?" Comparative Strategy, Vol. 8, 1989, p. 337.
43 Ibid, p. 337.
44 Drs. Van Cleave and Cohen, Tactical Nuclear Weapons: Doctrine, Capabilities, and Strategy, from Toward a New Defense for NATO: The Case for Tactical Nuclear Weapons, Agenda Paper No. 5, New York, National Strategy Information Center Inc, 1976, p. 12.

initiation of nuclear war; as a weapon of last resort, if conventional defense failed, to persuade the aggressor to terminate the conflict on acceptable terms."[45] "Flexible Response" was a built upon the premise that, by 1960, the Soviets also had substantial tactical and strategic nuclear weapons which largely offset America's nuclear arsenal.[46]

On May 25, 1961, President Kennedy directed the Secretary of Defense to reorganize the Army away from the Pentomic concept "...toward an organization emphasizing increased non-nuclear firepower...the abondonement of the Pentomic division concept meant a transition from a virtual dependence on nuclear weapons to almost exclusive dependence on conventional weaponry."[47] That Kennedy was not a believer in TNWs is clear in his statement that "the use of small nuclear armaments will lead to larger and larger nuclear armaments on both sides until the worldwide holocaust has begun."[48] The conventional based "Flexible Response" replaced the nuclear based doctrine of "Massive Retaliation," for U.S. forces in May 1962. NATO, reluctant to diminish the extended American nuclear shield, adopted "Flexible Response" as Military Committee document MC 14/3 in 1967.[49]

With the death of the Pentomic Division, a rise in Soviet/Warsaw Pact tactical nuclear capabilities, and a new emphasis on conventional deterrence, interest in developing a doctrine for tactical nuclear warfare declined dramatically.

Commenting on the ignorance within the Army on tactical nuclear war during this period, Brigadier General (then Major) wrote "the popular image of a huge mushroom cloud over the battlefield continues to debilitate thinking and planning for nuclear combat. We have become so preoccupied with the mushroom cloud that we have failed to think through what goes on beneath it."[50]

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45 McNamara, p. 64.
46 LTC Skelton, p. 20.
47 MAJ John P. Rose, The Evolution of U.S. Army Nuclear Doctrine, 1945-1980, Boulder CO, Westview Press, 1980, p. 76.
48 John F. Kennedy, as quoted in Robert Sam Anson, "The Neutron Bomb," New Times, 5 August 1977, p. 26.
49 McNamara, p. 64.
50 John P. Rose, The Evolution of U.S. Army Nuclear Doctrine, 1945-1980, p.xiii.

Reliance on strategies emphasizing a reliance on tactical nuclear weapons were under attack on the ground that their use would jump the "firebreak" that separated conventional and nuclear war, and that subsequent escalation would be uncontrollable once this firebreak had been breached, resulting in "large scale thermonuclear war."[51] Critics of nuclear weapons argued that use of tactical nuclear weapons would provide no significant advantage against a similarly equipped enemy, because although nuclear weapons use might provide temporary tactical advantage, that advantage would disappear when the enemy responded in-kind.[52] "Indeed, to the extent that the Warsaw Pact enjoyed superiority of manpower, mutual use of nuclear weapons could provide the Pact with sufficient residual conventional capability to make a decisive breakthrough."[53]

Fear of escalation and uncontained collateral damage of Germany combined to put a taboo on nuclear weapons. Writing in 1975, former Secretary of Defense James Schlesinger's views reflected the taboo that was developing during the Kennedy years; "in the interest of minimizing possible wartime destruction in NATO Europe, it is highly desirable to maintain a high nuclear threshold and use nuclear weapons only if necessary."[54] This essentially zeroed in on tactical nuclear weapons as they were the first step in the escalatory ladder. So frightened by the threat of escalation were some American defense planners, that they sabotaged efforts to improve tactical nuclear weapons capabilities and strategies fearing that improvements might make their employment more likely. The government refrained "from making investments in the capabilities for low-level nuclear warfare, not only because of the expense, but because creation of the options might tempt us to go through the firebreak, and would certainly give others the

51 Alain C. Enthoven, remarks made November 10, 1963, during an address at West Baden College ofLoyala, West Baden Springs Indiana, quoted in Robert M. Lawrence, "On Tactical Nuclear War," General Military Review, Part I, January 1971, p. 56.
52 Vokac, p. 21.
53 Michael J. Legge, Theater Nuclear Weapons and the NATO Strategy of Flexible Response, Santa Monica CA, The RAND Corp., 1983, p. 27, quoted in Ivo H. Daalder, The Nature and Practice of Flexible Response: NATO Strategy and Theater Nuclear Forces Since 1967, New York, Columbia University Press, 1991, p. 87.
54 James R. Schelsinger, The Theater Nuclear Force Posture in Europe, A Report to the United States Congress in compliance with Public Law 93-365, p. i.

impression that we were willing to do so."[55] The United States feared escalation so greatly that it put limitations on the use of its TNWs to NATO territory in the event they were ever employed in combat, believing that restricting their use to NATO territory would be less likely to lead to escalation than attacking targets in Warsaw Pact nations.

The policies begun in the Kennedy Administration which shifted the relative roles of conventional and nuclear weapons made a permanent and lasting impact throughout the rest of the Cold War. The Nixon Administration decided that NATO should have a capability of defending Europe *conventionally* for 90 days, thus maintaining the conventional emphasis.[56] The Carter Administration supported tactical nuclear weapons publicly; "Tactical nuclear weapons, including those for battlefield use, have strongly contributed to deterrence of conflict in Europe. I believe we must retain the option they provide, and modernize it."[57] Carter supported TNW modernization initially, but changed direction in midcourse, cancelling the development and production of enhanced radiation warheads in spite of a solid NATO consensus for deploying the weapons, due to vocal political opposition.[58]

During the 1970s, the Warsaw Pact achieved parity in nuclear weapons deployments in Europe. NATO responded by improving its conventional capability, but sought a way to achieve some kind of equalizing effect that tactical nuclear weapons had previously provided. NATO therefore embarked on what was known as "the offset strategy;" "...a program to counter the numerical superiority of opposing forces, with qualitative improvements in its own weapons, increased spending on conventional defenses, and increased cooperation among its member nations."[59]

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55 James R. Schlesinger, "Organizational Structures and Planning," Issues in Defense Economics, ed. Roland McKean, New York, Columbia University Press, 1967, as quoted in Van Cleave and Cohen, Tactical Nuclear Weapons: An Examination of the Issues, p. 17.
56 Daalder, p. 75.
57 Jimmy Carter, as quoted in Midgley, p. 143.
58 William R. Van Cleave and Samuel T. Cohen, Nuclear Weapons, Policies, and Test Ban Issues, New York, Praeger Publishers, 1987, p. 32.
59 Ashton B. Carter, William J. Perry, and John D. Steinbruner, A New Concept of Cooperative Security, Washington D.C., The Brookings Institution, 1992, p. 3.

At the end of the 1960s precision-guided munitions (PGM) technology based on advances in the hardware and software evolutionary process made its debut. The term "Precision-guided munitions" refers to a bomb or missile that is guided to its target during its terminal phase.[60] "Relatively inexpensive, very accurate, and non-nuclear, precision-guided munitions appeared to be able to provide cheaply firepower that was well below the "threshold" of nuclear weapons, and allow the defeat of a superior Soviet force."[61]

Precision weapons made their debut on the battlefield in 1972, with the employment of the laser-guided bomb and the tube-launched, optically-tracked, wire-guided (TOW) anti-tank missile for the first time in active combat operations in Vietnam. Known as "smart bombs," the U.S. Mk 82 and Mk 84 bombs were fitted with laser seekers and delivered by F-4 Phantom aircraft. Two F-4 Phantom aircraft using these new weapons succeeded in detroying the Than Hoa bridge south of Hanoi with devastating effect after more than 600 sorties had failed in previous bombing attempts.[62] Helicopter-launched TOW missiles were extremely successful at Kontum in Vietnam, during May 1972, two UH-1 Cobra helicopters equipped with the TOW missile destroyed 62 armor targets between them repelling a North Vietnamese tank supported assault.[63]

At the same time PGMs were coming on the scene, deployment of tactical nuclear weapons to Europe reached its zenith at 10,000 warheads in 1970.[64] But even official Army doctrine on employment of tactical nuclear weapons expressed doubts about uncontrolled escalation. In executing a defensive nuclear strike, the doctrine cautioned that the strike;

60 Digby, p. 1.
61 Christopher Campbell, p. 82, cited in Vokac, p. 10.
62 Stewart B. Menaul, "The Military Balance and its Implications: A European View," Strategic Review, Vol. V, No. 3, Summer 1977, p. 53.
63 The Illustrated Encyclopedia of 20th Century Weapons and Warfare, Ed. Bernard Fitzsimmons, New York, Purnell and Sons Ltd., 1978, p. 2516.
64 U.S. Senate Committee on Foreign Relations, Subcommittee on U.S. Security Agreements and Commitments Abroad, Lowenstein-Moose staff report on "U.S. Security Issues in Europe: Burden Sharing and Offset, MFBR and Nuclear Weapons," September 1973, as cited in Jorma K. Miettinen, "Enhanced Radiation Warfare," Bulletin of the Atomic Scientists, Vol. 33, No. 7, September 1977, p. 35.

> "must be effective enough to cause the enemy lead division to fall short of their initial goals, [but] the enemy should not be led to feel that the nuclear attack has threatened his overall viability. Excessive use could increase the incentives for the enemy to strike back with his nuclear forces and could lead touncontrolled escalation to strategic nuclear exchange."[65]

"An excessive application of force" the new policy warned, "would increase the incentive of the enemy to strike back with nuclear weapons in order to reestablish a satisfactory balance of force capability, rather than accepting a dangerously inferior posture."[66] Operating under such guidance, field commanders would be second-guessing any thoughts about using TNWs for fear of unleashing an escalatory spiral. Perhaps reflecting this lost confidence in their warfighting utility, reductions of tactical nuclear weapons began secretly in 1970 with the withdrawal of 3,000 Honest John rockets and 500 Sergeant missiles, over the next four years, reducing the total to about 7,000 by August 1974.[67]

General interest in the Army officer corps in tactical nuclear weapons was declining as Army officers began to perceive their use become more and more unlikely in the face of growing political resistance. Charting Army interest in tactical nuclear weapons by the number of articles dealing with that issue in the Army's professional periodical Military Review, Brigadier General (then Major) John Rose found that from 1955 to 1977, the number declined from a high of 164 during the 1950s decade, to 46 during the 1960s decade, and finally to only 19 articles in the 1970s decade (see Figure 1, next page).[68]

65 Headquarters, Department of the Army, Deployment and Employment Policy for Tactical Nuclear Weapons, Office of the Deputy Chief of Staff for Military Operations, Washington D.C., 25 April, 1973, pp. 9-10.
66 Ibid, p. 33.
67 Miettinen, p. 35.
68 MAJ Rose, p. 57.

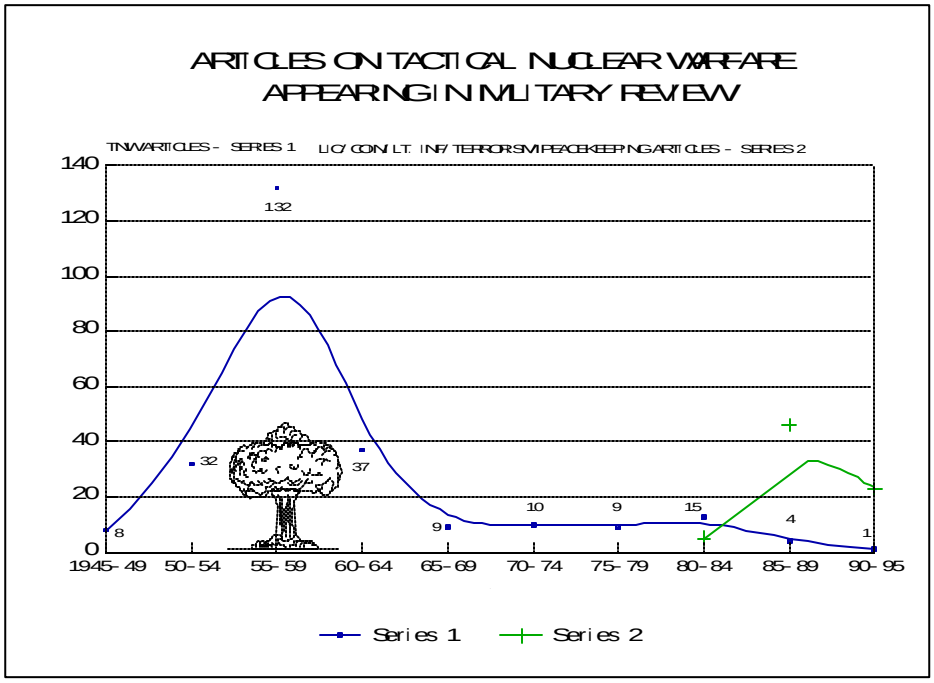

Figure 1: Articles on Tactical Nuclear Warfare Appearing in *Military Review*

This dramatic decline in interest reflected the conventional emphasis begun by the Kennedy administration. Official Department of Defense policy in 1970 emphasized conventional forces over tactical nuclear forces; "stalwart conventional forces are an essential element of deterrence and the primary initial means of defense against conventional attacks."[69]

Army doctrine for TNW emphasized deterrence over warfighting;

> "A credible tactical nuclear warfighting capability is a necessary ingredient of the [military] strategy since it is a *direct deterrent*, which, in conjunction with the conventional warfighting capability, makes nonnuclear massed attack and tactical nuclear attack unattractive alternatives for a potential aggressor."[70]

69 Schlesinger, p. i.
70 HQDA, Deployment and Employment Policy for Tactical Nuclear Weapons, p. 7.

Following the U.S. lead, NATO assigned the following roles, which were primarily politically motivated and deterrent in nature, to TNWs under the strategy of Flexible Response;

1. To deter the Warsaw Pact from conventional aggression against Western Europe and, if necessary, to blunt such aggression.

2. To deter the Warsaw Pact from the use of tactical nuclear weapons, and, if necessary, to respond at the same level.

3. to signal to the Warsaw Pact that the United States is willing to accept the risk of escalation in the defense of Europe, and is prepared even to resort to strategic nuclear weapons in that defense.[71]

The Reagan Administration seemed to give renewed emphasis to both conventional and nuclear forces in the Army. Reagan rebuilt Army strength and continued vigorous support of the "Off-Set" strategy, supporting the "Big Five" modernization programs that provided the modern fighting machines sent to the Gulf War; the M1A1 tank, the M3 Infantry Fighting Vehicle, the MLRS, and the Apache and Blackhawk helicopters. By the late 1970s, the Soviets had actually overtaken NATO in TNW numbers.[72] Attempting to redress this shift, Reagan also renewed emphasis on TNWs modernization. However, as time passed, Reagan backed off from nuclear forces and exhibited a preference for conventional over nuclear forces. Some of the actions the Reagan administration supporting concerning nuclear forces included;

- Pressed for an across-the-board modernization of NATO's TNF.
- Announced in Aug 1981 that production of fully assembled 8 in artillery and Lance enhanced radiation warheads would start immediately.
- Requested funds for 1,000 155mm E-R shells in January 1982.
- Resurrected the Pershing 1-B as a fallback if Pershing IIs were eliminated in INF talks.
- Supported the joint tactical missile system JTACMS as the follow-on-to-Lance (FOTL).[73]

Reductions in TNWs in Europe were taking place early on during the Reagan era. In October, 1980, 1,000 nuclear weapons were withdrawn from the NATO stockpile.[74] In 1981,

71 Manfred Werner, "NATO Defense and Tactical Nuclear Weapons," Strategic Review, Vol. 5, No. 4, Fall 1977, p. 13.
72 From a conversation with Dr. Van Cleave, at the Center for Defense and Strategic Studies, Springfield MO, 3 May 1995.
73 Daalder, p. 239.
74 Ibid, p. 230.

there were 5,999 nuclear warheads deployed to Europe. These included 1,069 air-delivered gravity bombs, 2,000 Artillery Fired Atomic Projectiles (AFAPs), 910 Lance and Honest Johns, 270 Pershing 1As, and 1,750 air defense or atomic demolition munitions.[75] In 1982, General Bernard Rogers, former Supreme Allied Commander Europe, proposed that improvements in conventional forces could support a strategy of "no early first use of nuclear weapons," reinforcing the taboo on nuclear weapons and emphasizing conventional forces to stay on the conventional side of the "firebreak."[76] In 1983, the NATO Council decided to cut an additional 1,400 warheads, mostly from the short and medium-range categories, from the stockpile by 1988, which would leave a total of 4,600 "the lowest level in twenty-five years."[77] In 1988, the SACEUR, General Galvin, indicated that NATO could further reduce its TNW forces by 1,000 AFAPs and air-delivered gravity bombs.[78]

A 1983 study on conventional deterrence in Europe recommended that NATO improve its conventional forces "utilizing newly available technologies, and accomplishing with conventional weapons what previously had required nuclear munitions."[79] It was anticipated that technological advances in precision-guided munitions would permit the very accurate delivery of large numbers of sub-munitions against armored formations at greater ranges allowing substitution of conventional weapons to cover targets generally ascribed to nuclear systems.[80] General Bernard Rogers, former SACEUR, proposed that improvements in conventional forces would support a strategy of "no early use of nuclear weapons," raising the threshold of nuclear weapons use.[81]

Consistent with an emphasis on conventional solutions, NATO

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75 McNamara, p. 68.
76 General Bernard Rogers, "The Atlantic Alliance: Prescriptions for a Difficult Decade,"Foreign Affairs, Summer 1982, pp. 1145-56, as quoted in McNamara, "The Military Role of Nuclear Weapons," p. 76.
77 Catherine McArdle Kelleher, "Managing NATO's Tactical Nuclear Options, Survival, p. 60.
78 Daalder, p. 277.
79 Strengthening Conventional Deterrence in Europe, Report of the European Security Study, New York, St. Martin's Press, 1983, as quoted in McNamara, "The Military Role of Nuclear Weapons,"Foreign Affairs, p. 77.
80 Thomas J. Hirschfeld, "Tactical Nuclear Weapons in Europe," The Washington Quarterly, Winter 1987, p. 104.
81 General Bernard Rogers, "The Atlantic Alliance: Prescriptions for a Difficult Decade,"Foreign Affairs, Summer 1982, as quoted in McNamara, "The Military Role of Nuclear Weapons," p. 76.

in 1984 adopted a "deep strike" strategy known as Follow-on Forces Attack (FOFA). This new approach was intended to utilize the promise of precision-guided munitions which had shown such to be successful in Vietnam and in the Arab-Israeli 1973 war where the initial Egyptian use of Sagger ATGMs was devastatingly effective in destroying Israeli armor. The parallels to defending against a tank-heavy Warsaw Pact army were obvious.

> "The new concept is heavily dependent on emerging technologies to produce conventional weapons systems that can acquire, track, and destroy Warsaw Pact forces 50 to 150 kilometers beyond the inter-German border, delaying or preventing them from reaching the battlefield."[82]

The FOFA strategy, a direct result of improvements in conventional weapons technology, sought to "stop the lead echelon of a Soviet attack with NATO ground forces, and to simultaneously launch air attacks using large numbers of precision-guided munitions against the second and third echelons of the Soviet forces to prevent them from coming to the support of the first echelon."[83]

Towards the end of the Reagan era, Gorbachev's Glasnost and Perestroika were thawing the edge off U.S.-Soviet relations. The subsequent INF agreements, the announcement by Gorbachev in Dec 1988, that the USSR would unilaterally reduce its conventional forces by 500,000 soldiers and 10,000 tanks, including 50,000 soldiers and 5,000 tanks from Eastern Europe, and then an announcement from Shevardnadze a month later that the Soviet Union intended to withdraw six Soviet tank divisions from Eastern Europe combined to put a freeze on nuclear modernization.[84] Consequently, the E-R AFAP was never fielded, and the Ground-Launched Cruise Missile (GLCM) disappeared.

By 1989, the Army recognized that "political and strategic objectives rather than tactical effect will likely guide the employment of nuclear weapons."[85] The ground commander's need

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82 Guertner, p. 343.
83 C. V. Chester, Arsenal of Democracy In the Face of Change: Precision Guided Munitions (PGMs), Their Evolution And Some Economic Considerations, Working Paper No. 4, Washington D.C., 1990, p. 8, cited in Vokac, p. 25.
84 Daalder, p. 278.
85 Headquarters, Department of the Army, FM 100-15: Corps Operations, Washington D.C., USGPO, 1989, p. 3-12. See also HQDA, FM 100-5: Operations, Washington D.C., USGPO, 1986, p. 45.

for firepower might very well take a back seat to political requirements. According to the 1986 FM 100-5: Operations, the Army keystone doctrinal manual, release of nuclear weapons "will be predicated on a high confidence that the effects achieved will be precisely those intended, no more, no less."[86] The 1986 version of FM 100-5 appeared to suggest that even after nuclear release, "little flexibility exists at corps level for integration of nuclear and conventional fires," and maneuver.[87] With such constraints, the 1986 doctrine was not very convincing in describing nuclear weapons as firepower that could be counted on, when needed, to support operations.

On May 3, 1990, President Bush responded to the improving European security situation by calling for a major review of the NATO alliance political and military missions and called for U.S.-Soviet negotiations on short-range nuclear forces as soon as the Conventional Forces in Europe (CFE) Treaty was signed. Bush at the same time announced that he was cancelling the follow-on-to-Lance and modernization of the Army's Europe-based atomic artillery fired projectiles.[88]

Saddam Hussein's invasion of Iraq on August 2, 1990, prompted Bush to begin Operation Desert Shield with the deployment of the 82d Airborne Division to Saudi Arabia to defend against possible attack by Iraqi forces. As the Army deployed two corps to face off against a tank-heavy army, its nuclear doctrine was clearly expressed in the doctrinal manuals covering division and corps level operations. FM 100-15: Corps Operations, envisioned employment of corps nuclear weapons to;

> "create gaps in enemy defenses to support offensive maneuver, destroy second echelons of enemy forces engaged with corps combat elements, interdict enemy follow-on forces or formations in depth, support denial operations, destroy the enemy's nuclear and chemical capabilities, and destroy the enemy's support capability."[89]

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86 HQDA, FM 100-5: Operations, 1986, p. 45.
87 MAJ Vokac, p. 14.
88 Thomas-Durrel Young, "The Need for NATO-Europe's Substrategic Nuclear Weapons," Orbis, Vol. 36, No. 2, Spring 1992, p. 229.
89 Headquarters, Department of the Army, FM 100-15: Corps Operations, Washington D.C., USGPO, 1989, p. 3-12.

However, TNWs were not to play a large role, for as the Desert Shield deployments began to unfold, the Joint Chiefs of Staff decided **not to deploy TNWs** with Army, Marine Corps, and Air Force units deploying to the area.[90] Desert Storm would showcase the arrival of advanced conventional munitions in favor of TNWs.

The "second Russian revolution," the failed August 1991 coup, and the disintegration of the former Soviet Union that followed, dramatically changed the European security situation further, and brought about another reevaluation of NATO nuclear policy. Former Defense Secretary Dick Cheney said in an interview on CNN, that tactical nuclear weapons "no longer have much validity in the new European environment.'[91] Simon Lunn, then Deputy-Secretary General of the North Atlantic Assembly, made up of legislators from the 16 member nation countries of NATO, said that "as [the FSU's] conventional superiority recedes, then the need for us to have these systems [TNWs] recedes also.'[92]

On September 27, 1991, President Bush responded to the dramatic changes by announcing a unilateral disarmament initiative which de-nuclearized the United States Army and the U.S, military forces dramatically. The Army's nuclear stockpile of 850 Lance missiles and some 1,300 artillery-fired atomic projectiles (AFAP) were to be withdrawn from service and all modernization plans scrapped.[93] The U.S. Navy saw its nuclear-armed Tomahawk cruise missiles, B57 and B61 nuclear gravity bombs, and nuclear depth charges removed from its ships and placed in storage.[94] The U.S. Air Force was forced to cancel the development of its new strategic air-to-surface missile, and soon found itself the only nuclear-capable service **readily able** to provide deterrent and warfighting tactical nuclear weapons in the form of air-delivered gravity bombs.[95] The day after the Bush announcement, General Colin Powel announced that

90 J. M. Broder, "U.S. Forces Have No Nuclear Arms in Gulf; States, No Plans to Use Them,"Los Angeles Times, 20 October 1990, p. 37, cited in LTC John D. Skelton, The Forbidden Weapon - The Employment of Army Tactical Nuclear Weapons, A monograph presented to the School of Advanced Military Studies, US Army Command and General Staff College, Fort Leavenworth KS, 9 May 1991, p. 31.
91 Sally Jacobsen, "NATO Ponders Nuclear Arms Cut,"The Washington Times, September 14, 1991, p. 5.
92 Jacobsen, p. 5.
93 Young, p. 229.
94 COL Stobbs, p. 197.
95 See Marc D. Millot, Roger Molander, and Peter A. Wilson, "The Day After..." Study: Nuclear Proliferation in the Post-Cold War World, Volume I, Summary Report, Santa Monica CA, the RAND Corporation, 1993, p.xii.

the Army would "...destroy approximately 1,300 cannon-fired projectiles of three different types - two eight-inch howitzer types and one 155mm type. We will also destroy 850 Lance missile warheads."[96]

With the implementation of the Bush initiative, only 700 U.S. air-delivered bombs remain deployed with U.S. and allied forces in the United Kingdom, Germany, the Netherlands, Belgium, Italy, Greece, and Turkey.[97] Those 700 remaining weapons were placed in storage. "As a force that now has no organic nuclear capability, the Army must rely on Air Force and Navy nuclear capabilities" to support contingency force operations and deter potential aggressors from using weapons of mass destruction.[98]

These dramatic cuts in weapons, it was believed, were not so detrimental to deterrence or military capability, as "modern conventional weapons can produce near-nuclear blast effects."[99] General Colin Powell in announcing the cuts stated that "the increased capability associated with conventional weaponry in recent years has inclined us to getting rid of tactical nuclear weapons. We can now do conventionally much more efficiently things we thought we could only do with tactical nuclear weapons."[100] U.S. forces in Desert Storm demonstrated the power of conventional weapons in destroying fleeing Iraqi convoys along the "highway of death" Basra-Kuwait City highway and in the nationally televised bullseye hits at targets deep inside Iraq with laser guided munitions and super-accurate cruise missiles.

Even the Soviets had been impressed with this new capability, proclaiming it a Military-Technical Revolution (or in the West, a Revolution in Military Affairs) and reevaluating their own military strategy in light of the overwhelming U.S. led victory.[101] "The success of

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96 "Presidential Initiative - Public Affairs Guidance," Department of the Army, Message 011000Z October 1991, p. 3, cited in MAJ Vokac, p. 1.
97 Michael J. Mazarr and Alexander T. Lennon, Toward A Nuclear Peace, St. Martin's Press, New York, p. 35.
98 Headquarters Department of the Army, FM 100-5: Operations, Washington D.C., USGPO, 1993, p. 6-11.
99 Headquarters, U.S. Army Training and Doctrine Command, FM 100-7: The Army in Theater Operations, Coordinating DRAFT, 24 December 1991, p. 4-12.
100 "Presidential Initiative - Public Affairs Guidance," Department of the Army, Message 011000Z October 1991, p. 4, cited in Vokac, p. 2.
101 Ronald M. Mazzia, "Tracking The Storm," Military Review, Vol. LXXI, No. 10, September 1991, p. 77.

Operation Desert Storm has created the hope that in the post-Cold War world, conventional weapons can replace nuclear forces as a means of deterring aggression and reassuring allies."[102]

During the Clinton administration, there has been some interest in TNWs, specifically in so called "micro-nukes". Interestingly enough, the study began at the urging of senior Air Force officials impressed by the precision of laser-guided missiles and bombs used against the Iraqis in Desert Shield/Desert Storm. The Air Force established a program, Project PLYWD (Precision Low-Yield Weapons Design, pronounced "plywood") - "to investigate the idea of precision, low-yield weapons as a credible option to counter the employment of nuclear weapons by Third World nations."[103] The Clinton Administration requested funding in the 1994 budget for the development of new types of small nuclear weapons; micro-nukes, mini-nukes, and tiny-nukes weapons with yields of approximately 10 100 and 1,000 tons, respectively.[104]

In 1994, the advocates of conventional deterrence (conventionalists) proposed that the United States should convert its *strategic deterrent* "from nuclear weapons to a more credible deterrence based at least in part upon 'smart' conventional weapons."[105] The Nuclear Policy Review published in February 1995 pointed to the fact that U.S. TNW had been reduced by 90 percent since 1988 (See Figure 2 next page) and called for the elimination the option to deploy nuclear weapons on carrier-based dual-capable aircraft, further reducing the TNW support available to U.S. contingency forces deployed abroad.[106]

The debate over conventional vs. nuclear seems to have been decided in favor of a conventional approach. However, this decision was based primarily over political matters rather than issues of weapons performance or capabilities. The next section will compare the capabilities of the two to determine whether or not advanced conventional weapons can substitute for nuclear ones as many claim.

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102 Millot, Molander, and Wilson, p. 12.
103 Sinai, p. 19A.
104 William M. Arkin, "Nuclear Junkies: Those Lovable Little Bombs,"The Bulletin of the Atomic Scientists, July/August 1993, p. 24.
105 Paul Nitze, "Is It Time to Junk Our Nukes?" Washington Post, January 16, 1994, pp. C-1 to C-2.
106 William Perry, Report of the Secretary of Defense to the President and the Congress, February 1995, USGPO, Washington D.C., p. 10.

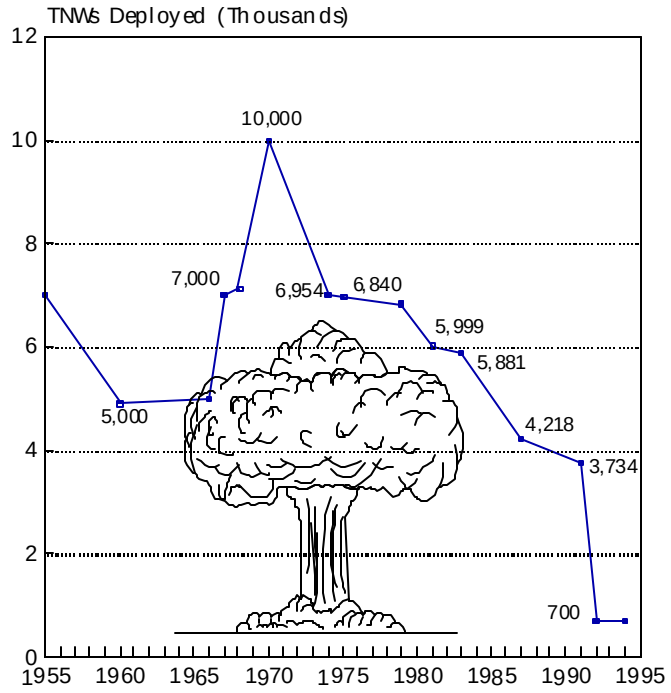

Figure 2; Tactical Nuclear Weapons Deployed to Europe, 1955-1995

† Sources of Data for Figure 2;

1955 - 1974; Jorma K. Miettinen, "Enhanced Radiation Warfare," Bulletin of the Atomic Scientists, Vol. 33, No. 7, September 1977, p. 36.

1975 - 1991; Ivo H. Daalder, The Nature and Practice of Flexible Response: NATO Strategy and Theater Nuclear Forces Since 1967, New York, Columbia University Press, 1991, p. 301.

1981; Catherine McArdle Kelleher, "Managing NATO's Tactical Nuclear Options, Survival, Vol. XXX, No. 1, January/February 1988, p. 60.

1991 - 1995; Michael J. Mazaar and Alexander T. Lennon, Toward A Nuclear Peace, St. Martin's Press, New York, p. 35.

CHAPTER 2

SUBSTITUTION OF ACW FOR TNW

Many now believe that "improvements in conventional forces [ACWs] can substitute for the retention of a large nuclear stockpile. Substitution allows...[for] a defensive posture with *both* high capability and high credibility."[107] Advanced conventional weapons allow the United States "to conduct many extended deterrent missions without nuclear strikes. Given the experience of the Gulf War, any adversary would have to view such a force as a potent deterrent, with weapons capable of destroying hardened command and supply centers - *missions formerly assigned to tactical nuclear weapons*."[108] These viewpoints are characteristic of the enthusiasm for substituting TNWs with ACWs to fulfill the deterrent and warfighting roles previously ascribed to nuclear weapons.

Although our deterrence is now presently based primarily on conventional systems, it is worth investigating whether or not ACW can really substitute for the many missions assigned to TNWs in the past. In comparing ACWs to TNWs, three categories present themselves for the purposes of making comparisons; weapons effects, accuracy and probability of kill, susceptibility to counter-measures, flexibility in use, and costs. Before making these comparisons, however, a review of the roles and missions assigned to TNWs is in order. The primary role of TNWs was deterrence, specifically deterring Soviet conventional aggression and if war broke out, to deter Soviet use of TNWs, and ultimately to signal that the U.S. was willing to link tactical nuclear use to strategic use if necessary to defend Europe.[109] The primary emphasis of the deterrent role of TNW was to keep any conflict conventional in nature.[110] The

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107 Stephen D. Biddle, How To Think About Conventional Nuclear Substitution: The Problem of Structural Uncertainty, Volume I: Main Report, prepared for the Office of the Assistant Secretary of Defense for Atomic Energy and Office of the Under Secretary of Defense for Research and Engineering, Alexandria VA, Institute for Defense Analysis, May 1986, p. 2.

108 Robert H. Scales, Brigadier General, (US Army), Certain Victory: The U.S. Army in the Gulf War, Office of the Chief of Staff, United States Army, Washington D.C., 1993, p. 167, emphasis mine.

109 Werner, p. 13.

110 Gormley, p. 14.

secondary role of TNWs was warfighting: "The [Army] corps will employ nuclear weapons to achieve operational and tactical objectives that support the theater and campaign plan."[111]

TNWs were assigned specific missions to achieve battlefield results to support the roles explained above. The are two general missions for TNWs in Europe; the denial mission and the punishment mission.[112] The denial mission of TNW refers to the use of nuclear weapons to deny the enemy their military objectives by destruction of their forces, while the punishment mission refers to the use of nuclear weapons to inflict "pain on the enemy in sufficient quantity to induce him to call off his attack, even though he may retain the military means to continue the offensive."[113]

The specific targets given to TNWs to accomplish these missions were;

- First-Echelon Maneuver Battalions
- Second-Echelon Maneuver Battalions and Reserves
- Conventional Artillery
- Field Command and Communications Centers
- Air Defense Units
- Forward Logistics (Trains Areas)
- Landing Fields and Parked Aircraft
- Nuclear Delivery Missiles and Rockets
- Transportation Networks (Railroads, Bridges, etc.)
- Supply Depots[114]

The first two targets mentioned deal with blunting an enemy attack by destroying the enemy's combat power, the rest, with denying him the means to support an offensive. Targets for TNWs were those with a high payoff value where high probability of success (kill) was required.

111 Headquarters, Department of the Army, FM 71-100: Division Operations, USGPO, Washington D.C., September 1990, p. E-1.
112 Biddle, pp. 7 & 8.
113 Biddle, pp. 7 & 8.
114 System Planning Corp, p. 36.

WEAPONS EFFECTS

Our comparison of TNWs to ACW begins with weapons effects. In making these comparisons, it is important to remember the roles, missions, and the targets they produced. Unwanted collateral damage is often cited as the most significant negative consequence of using nuclear weapons, even TNWs. Nuclear weapons are "area weapons" and while ACW can achieve area effects, it does so with numerous smaller conventional explosions dispersed over the target area.

In as much as NATO had already committed itself to a policy of using TNWs only on NATO soil to repel an invasion, a tactical nuclear war in Europe would have seen the majority of nuclear detonations taking place on German soil. A study by the Max Planck Institute in 1971 on tactical nuclear war concluded that even if only 10 percent of NATO's battlefield nuclear weapons were employed, and then only in the area of military operations, "heavy damage would result" to the German nation would result. If Soviet battlefield nuclear weapons were included in these estimates, the result would have been the "political annihilation" of the Federal Republic of Germany.[115] "With European publics aroused to the horrors of nuclear war on European soil, NATO governments have hastened to reassure their electorates that everything possible is being done to avert such a possibility."[116] "Everything possible" has meant de-emphasizing TNWs.

Countering this annihilistic point of view are arguments by Drs William R. Van Cleave and Samuel T. Cohen who argued that a tactical nuclear arsenal of low-yield battlefield weapons would not produce such catastrophic effects, due to reduced blast effects and lower residual contamination effects. Additionally, they point out that catastrophic destruction impedes offensive maneuver operations, which would be detrimental to Soviet success.[117] Nuclear

115 Klaus Reinhardt, "Problems of Employing Nuclear Weapons Considering the Special Situation of the Federal Republic of Germany," US Army Reference Book 101-31, Tactical Nuclear Operations, US Army Command and General Staff College, Fort Leavenworth KS, pp. 7-7 to 7-8, cited in Michael W. Cannon, "Battlefield Nuclear Weapons and Tactical Gridlock In Europe," Military Review, Vol. LXIX, No. 10, October 1989, pp. 53-54.
116 Biddle, p. 1.
117 Samuel T. Cohen and William R. Van Cleave, "Western European Collateral Damage from Tactical Nuclear Weapons," Defence Yearbook 1976/77, Ed. The Royal United Services Institute for Defence Studies, London, Brassey's Publishers Ltd., pp. 61-63.

weapon technology has progressed to the point where weapons can now be produced with very specific blast effects which are relatively clean (i.e. low amounts of residual radioactivity and little collateral damage). Even existing TNWs have a "dial-a-yield" feature that allows for lower yield explosions that would control unwanted collateral damage.[118]

In addition to improvements in nuclear technology, the guidance and targeting systems of today's delivery systems are very precise and TNWs mated to these systems require less destructive power or yield, to kill the target, thereby minimizing collateral damage. This precision allows nuclear yields to be specifically tailored down to accomplish the target mission with the minimal possible yield.[119] "Given the guidance capabilities demonstrated in Desert Storm, a 'micro-nuke' with a yield on the order of 10 tons (20,000 pounds of high explosives), would be very effective against for example, command and control facilities or airfields."[120] The issue of collateral damage and residual fallout is really not an issue at all, at least not technologically speaking. However, perceptions of tactical nuclear warfare are difficult to change and the "debilitating" image of the "mushroom cloud" that Brigadier General (then Major) Rose spoke of remains with us today.

ACWs, in theory, produce no significant collateral damage. The high accuracy associated with ACWs generally allows specific effects on the target without unwanted side-effects. "Precision-guided munitions are essential to mission accomplishment with minimal collateral damage."[121] ACWs offer the advantage of surgical specificity in application over TNWs which are area weapons. "Collateral damage from smart weapons employment would most often arise from operator error, software of hardware failure, or targeting error. They can prove especially effective in environments operating under strict rules of engagement (ROE)."[122]

Nuclear weapons have other unique debilitating effects that ACW cannot achieve. The

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118 Robert Sam Anson, "The Neutron Bomb," New Times, August 5, 1977, p. 27.
119 Steven T. Possony, "NATO and the Dawn of New Technology," Defense and Foreign Affairs, October 1976, p. 19.
120 Thomas W. Dowler and Joseph S. Howard III, "Countering the Threat of the Well-Armed Tyrant: A Modest Proposal for Small Tactical Nuclear Weapons," Strategic Review, Vol. XIX, No. 4, Fall 1991, p. 36.
121 Charles A. Horner, "The Air Campaign," Military Review, Vol. LXXI, No. 9, September, 1991, p. 26.
122 MAJ Vokac, p. 36.

first of these is Electro-Magnetic Pulse (EMP). The intense burst of electro-magnetic radiation, or EMP, can render inoperable any electronic device in operation and unshielded at the time of detonation. Enemy communications would be disrupted until replacements or repairs could be made to damaged communications equipment.[123] Additionally, nuclear weapons explosions are accompanied by initial intense and blinding flash of light. This blinding flash could temporarily cripple units not prepared for the blast at great distances from the point of detonation. The flash and blast effects would be disastrous to enemy pilots and aircraft near the area of operations as airframes are relatively soft to blast effects.[124] Nuclear explosions have residual effects stemming from residual radioactivity at the point of detonation, and, possibly from radioactive fallout. The amount of radioactive contamination is a function of the yield of the weapon, whether it was an air or ground burst, and what effects it was intended to produce (EMP, Gamma radiation, or pure destructive power). Finally, the enormous psychological effect of nuclear weapons, the blinding flash and spectacular mushroom cloud, of even low-yield nuclear weapons, is unique to nuclear weapons.[125] "Nuclear weapons dispose of a psychological impact quite independent of their actual effectiveness; this effect cannot be reproduced by conventional weapons, no matter how terrible."[126] "Even soldiers outside the immediate target area may be affected simply by knowing that such [nuclear] weapons are being used."[127] It is difficult to estimate this effect, but in as much as the world has not seen a nuclear weapons used in anger since 1945, this effect should not be underestimated.

123 Combined Arms and Services Staff School, Combined Arms Operations Volume One of Three Volumes, US Army Command and General Staff College, Fort Leavenworth KS, April 1992, p. 143.
124 System Planning Corp., p. 69.
125 McGeorge Bundy, "Nuclear Weapons and the Gulf," Foreign Affairs, Vol. 70, No. 4, Fall 1991, p. 88.
126 Biddle, p. 8.
127 Combined Arms and Services Staff School, Combined Arms Operations Volume One of Three Volumes, April 1992, p. 139.

LETHALITY

In terms of lethality, the two types of weapons ACWs and TNWs, differ in effects as well. ACWs rely on explosive power alone, while TNWs have both explosive power and lethal radiation:

> "Units struck by ACW tend to suffer more damage to equipment than to personnel. The reverse is true for units struck by nuclear weapons. Moreover, the damage to personnel from the radiation and thermal effects of nuclear weapons increases over time, as the symptoms of ionizing radiation and the debilitation from burns becomes manifest...The end result is that units struck by ACW tend to recover over time, as the wounded members of the unit repair equipment and return it to service. Units struck be nuclear weapons tend to get less capable over time, as radiation sickness or burns progressively incapacitates personnel or degrades their performance."[128]

In the aftermath of Desert Storm, many were quick to point to the near-nuclear destructive effects of ACW on the Iraqi army. The House Armed Services Committees staff's estimates of Iraqi casualties were 9,000 dead and 17,000 wounded. Some estimates were many times higher, mostly spurred by scenes of devastation such as the destroyed Iraqi retreating convoys which had attempted to flee on the Basra-Kuwait Highway (aka the "Highway of Death"). "JSTARS (Joint Surveillance Targeting and Acquisition Radar System) located Iraqi forces retreating along the 'Highway of Death'...during the night and directed coalition aircraft armed with CBU improved conventional munitions which annihilated fleeing Iraqi forces with near nuclear effects."[129] However, using historical ratios of wounded POWs to enemy KIAs and WIAs, John G. Heidenrich estimated that Iraqi casualties were somewhere between 700 and 3,000 dead, with somewhere between 2,000 and 7,000 wounded. 71,000 Iraqis were taken prisoner by the coalition forces. Enemy equipment destroyed by strictly conventional weaponry

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128 Terrel E. Greene, Howard A. Zwemer, and Steven F. Woodford, A Basis For Comparing Advanced Conventional Weapons With Tactical Nuclear Weapons, Volume 1, A technical report prepared for the Director, Defense Nuclear Agency, Washington D.C., 1 April 1986, pp. iv to v.

129 Daniel P. Leaf, Colonel, (USAF), Unity of Command and Interdiction, Maxwell Air Force Base AL, College of Aerospace Doctrine, Research and Education, Airpower Research Institute, July 1994, pp. 66 and 67.

were 2,162 tanks, 525 APCs, and hundreds of wheeled vehicles, but most of the crews survived.[130]

The high numbers of destroyed equipment are impressive, and the lower casualty figures that Heidenrich determined support the findings of Greene, Zwemer, and Woodford that units struck by ACW tend to be able to recover. Clearly, if nuclear weapons had been used, the tactic of fleeing the vehicles would not have saved the Iraqi crews from deadly blast and radiation effects which would have covered the entire target area.

ACWs have achieved impressive results in Desert Storm as described above. Proponents of conventional-based deterrence estimate that a twelve-round volley of the advanced technology MLRS/TGW, for example, is predicted to kill as many vehicles in a Soviet Army type tank company as a 1 kt nuclear artillery shell.[131] The MLRS, fielded in 1983 has nine rocket tubes which can fire out to 30 km. "Each rocket carries a CBU-like warhead with 688 bomblets of various types, the most common of which is dual-purpose improved conventional munitions (DPICM). DPICM bomblets function as a shaped charge against hard targets, or as antipersonnel rounds."[132] The CBUs used in Iraq lived up to predictions made in 1984: "two container weapons loaded with guided submunition would be able to destroy 15 to 30 armored fighting vehicles per [aircraft] pass; this result matches that which can be achieved with one 10-kiloton nuclear weapon."[133] ACWs now approach the same probability of kill associated with low-yield TNWs.[134] In the Gulf War, for example, F-117s had a probability of target destruction of 80 percent, approximating the requirements of the strategic nuclear SIOP.[135]

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130 John G. Heidenrich, "The Gulf War: How Many Iraqis Died?" Foreign Policy, No. 90, Spring 1993, pp. 109-125.

131 See Donald R. Cutter, "Potential Future Roles for Conventional and Nuclear Forces in the Defense of Western Europe," Strengthening Conventional Deterrence in Europe: Proposals for the 1980s; Report of the European Security Study (ESECS), New York, St. Martin's Press, 1983, pp. 230-232, cited in Biddle, p. 9.

132 COL Leaf, p. 57.

133 Dr. Fred Wikner, The Wall Street Journal, July 24, 1984, cited in Greene, Zwemer, and Woodford, 1986, p. 2.

134 Commander Hank Prevette, (USN), An Absence of Will, a paper submitted the faculty of the Naval War College, Newport, RI, May 15, 1987, p. 12.

135 See Robert P. Haffa Jr., "The Future of Conventional Deterrence: Strategies and Forces to Underwrite a New World Order," Conventional Forces and the Future of Deterrence, Eds. Gary L. Guertner, Robert P. Haffa, and George H. Quester, Carlisle Barracks PA, Strategic Studies Institute, US Army War College, cited in Charles T. Allan, "Extended Conventional Deterrence: In From the Cold and Out of the Nuclear Fire?" The Washington Quarterly, Vol. 17, No. 3, Summer 1994, p. 209.

However, some targets, such as airfields, are more immune to conventional warheads than to nuclear ones. The radiation contamination effects of nuclear weapons have the same denial-of-use character of chemical agents. That is, there is residual lethality which denies the enemy use of the terrain that is hit without incurring risks of contamination. The following illustrates the advantages of TNWs in airfield destruction and denial of use.

> "Coalition air forces bombed Iraqi airfields repeatedly during Desert Storm, but the frustrating experience of World War II was repeated. Airfield maintenance personnel were able to repair quickly the crater damage caused by conventional weapons. Had the United States not been allowed time to build up overwhelming air superiority, these airfields might have played a major role in the battle. An EPW [Earth-Penetrating Warhead] crater, on the other hand, would have a radius on the order of 15 meters, and a volume of on the order of 3000 cubic meters, and the crater would be very radioactive. Such a crater would be very difficult to repair, resulting most likely in the airfield's being neutralized for the duration of the conflict."[136]

Another target not so vulnerable to conventional weaponry is the SCUD type missile armed with a chemical or biological warhead. Patriot missiles were effective in destroying SCUDs in the Gulf War, but those had conventional warheads. A chemical or biological warhead atop a SCUD will still be dangerous after the missile is destroyed in flight as the agents are extremely potent. Some nerve agents are so powerful that a mere pin-point drop is more than lethal enough to kill a man quickly. "The United States would benefit in this scenario by having an anti-tactical ballistic missile (ATBM) carrying a 'mini-nuke' warhead with a yield of about 100 tons...the radiation of the 'mini-nuke' would destroy the oncoming or sterilize the chemical or biological agent."[137]

136 Dowler and Howard, p. 37.
137 Dowler and Howard, p. 37.

COUNTERMEASURES

Since the shield followed on the heels of the sword, every weapon has seen a countermeasure to nullify its power. In this area of comparison, TNWs have the upper hand. Once targeted, nuclear weapons are essentially countermeasure-proof. "The principal kill mechanism of TNF [tactical nuclear forces] in the anti-armor role - prompt gamma and neutron radiation - can only be countered with shielding materials whose weight imposes prohibitive burdens on a mobile attacker. Dispersion can reduce the loss to any given nuclear burst, but only at substantial cost to conventional effectiveness."[138]

What might possibly be considered a countermeasure might be retaliation-in-kind. Certainly, the Soviet's large TNW arsenal had a deterrent effect on our use of our own should war ever break out, but the Soviets stood to destroy any advantage we might have gained by using TNWs as they could retaliate in kind to a greater degree. Articulating this sentiment, COL Harry Summers wrote in 1991; "what made it worse was a general conviction that those short-range nuclear artillery warheads were not worth the bother they caused, for it was hard to envision a scenario when they would actually be used, especially because they would provoke retaliation in kind."[139]

Countermeasures to ACWs can take the form of technological responses, or new tactics. The 1973 war saw the introduction of the SAGGER ATGM, which proved devastating to Israeli armor. However, eventually the Israelis developed new *counter-tactics* which greatly reduced their effectiveness.[140] Technological countermeasures to ACWs are numerous. Thermal target signatures can be suppressed by shrouds and baffles. Radar signatures can be suppressed by Radar Absorbent Material (RAM) or radar scattering nets. Visual signatures can be suppressed by chaff, smoke (which does not negate thermal trackers), and by "multi-spectral aerosols" which obscure the target from laser designation.[141] Indeed, Russia's new T-90 tank is reported to have

138 Biddle, p. 10.
139 Harry Summers, Colonel, US Army (Ret), "Good Riddance to a Nuclear Disaster,"Army Times, October 14, 1991, p. 78.
140 MAJ Vokac, p. 24.
141 Biddle, p. 11.

a Defensive Aids Suite (DAS) composed of a computer driven system of laser sensors, I-R jammers/emmitters, and special aerosol grenades which can obscure the tank from the laser source within three seconds of detecting the incoming laser beam.[142] And then again there is always the shield approach; armor thickness can be increased with applique or reactive armor retro-fits to existing tank models.

Of course, although ACWs were intended to extend the nuclear threshold, it is not totally improbable that an opponent not able to compete in the emerging high technologies of advanced conventional weaponry, might be tempted to "wipe out such modern gadgetry with the 'most modern' [nuclear] munitions; PGMs are no match for tactical nuclear weapons."[143]

The measure/countermeasure race for dominance results in uneven performance of systems from one war to the next. "Success is dependent upon where that relationship stands at the time of the conflict. The state of this competition at the time of actual conflict would be the uncertainty in predicting the ability of ACMs to reduce demand for and substitute for TNWs.[144] Regarding countermeasures, then, it seems that there are considerably more effective countermeasures to ACWs than to TNWs. "They [ACWs] do improve the GPF [General Purpose Forces] capability to some extent, *dependent upon a net assessment that includes the Red technology operational advances*, but they do not substitute for nuclear [battlefield] weapons."[145]

142 James M. Warford, "The Russian T-90/T-90S Tank: An Old Dog With Some Dangerous New Tricks,"Armor Magazine, Vol. CIV, No. 2, March-April 1995, pp. 7 and 8.
143 COL Marc Geneste, French Army (Ret), "The Nuclear Land Battle," Strategic Review, Vol. IV, No. 1, Winter 1977, pp. 80 and 81.
144 Biddle, p. 26.
145 remarks attributed to Dr. Van Cleave, see B. A. Wellnitz, LASL Panel on Tactical Nuclear Warfare, Report of the Fifth Meeting (Short Title: TAC-5), April 5-6, 1977, United States Energy Research and Development Administration, August 1977, p. 339, emphasis mine.

COSTS

Cost is another area for comparison between ACWs and TNWs. Maintenance of nuclear-capable or dual-capable aircraft or artillery forces has associated monetary and readiness costs. Nuclear weapons require a separate infrastructure due to their unique lethality and security requirements. Artillery units that had the mission to fire AFAPs were required to spend considerable time training and preparing for that mission. Time spent training on nuclear tasks was also a cost in that it detracted from conventional warfighting training.[146] Writing in 1987, Navy Commander Hank Prevette called for a reduction of 50 percent in TNWs in Europe believing that "the savings realized in [reducing] 3,000 warheads would provide millions of dollars toward conventional hardware."[147] Lt. Col. Skelton writing in 1991 believed that "the elimination of Army TNW would certainly save a considerable sum of money at a time of fiscal austerity."[148]

Comparisons of costs of the conventional and nuclear versions of the same type weapon (eg. artillery rounds) are unfair in that the comparison does not take into account the **effects** of each type of munition. However, such a comparison is illustrative of the vast difference in cost between "dumb" weapons and their nuclear counterpart. Minutes of a 1973 Congressional hearing reported that the cost of a nuclear 155mm AFAP was about $452,000 compared to the same caliber conventional round cost of $19.00. For a 203mm AFAP, the minutes reveal a cost estimated at $400,000 for the nuclear version and about $56.00 for the conventional round.[149]

Arguments in 1977 against the neutron bomb, a very effective tactical nuclear weapon, often centered around costs vis a vis ACWs:

"Money spent on enhanced radiation weapons...could approach $3 billion...a comparable expenditure could well buy a more effective and usable conventional capability to deal with the threat of Soviet tanks. With the advent of precision-guided weapons (PGM), Soviet tanks are

146 MAJ Vokac, pp. 21-22. See also LTC Skelton, p. 36.
147 Prevette, p. 12.
148 LTC Skelton, p. 37.
149 Hearings Report: Subcommittee on Military Applications of Atomic Energy of the Joint Committee of Atomic Energy for May 22 and June 29, 1973, USGPO, 1973, p. 101, cited in LTC Skelton, p. 30.

becoming far more vulnerable to destruction by high explosives. The neutron bomb budget could add more than 100,000 precision anti-tank weapons to the NATO arsenal."[150]

The cost of maintaining nuclear weapons is high - in 1979, for example, it cost approximately $500 million to maintain 7,000 tactical nuclear weapons in Europe.[151] Arguments are being presented today which favor conventional forces on the issue of cost. "[F]unds that would otherwise be allocated for nuclear weapons could be used *more efficiently* to maintain conventional military forces to protect U.S. interests against threats from transitional states."[152] However, those arguments are countered in favor of TNWs, again on the issue of cost: "TNWs can still provide an *economic advantage* in meeting national security objectives by compensating for reductions in the defense budget...in Europe, TNWs offered a cheap means of offsetting [a] conventional force imbalance."[153]

However, while "dumb" munitions like the artillery rounds discussed earlier are relatively inexpensive, ACWs are not cheap. The Tomahawk missiles used in the Gulf War cost approximately one million dollars a piece.[154] Based on figures available in Aviation Week and Space Technology, each Hellfire missile costs approximately $41,000, the Maverick; $102,978, and the HARM (High-speed Anti-Radiation Missile); $241,993.[155] The large number of ACW weapons required to achieve the same effects as nuclear weapons tends to erase what appears on the surface to be a cost advantage. Comparing the number of rounds required to destroy various targets, and then computing their collective costs in 1990 dollars, Greene, Zwemer, and Woodford concluded that TNWs "with sufficient yields achieve higher percentages of damage at a lower cost."[156] Using the example of an SS-21 battalion target, they concluded that

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150 Alton Frye, "The High Risks of Neutron Weapons; The Neutron Bomb Risks,"The Washington Post, July 17, 1977, p. B-1.

151 See The Boston Study Group, The Price of Defense: A New Strategy for Military Spending New York, The New York Times Book Co., 1979, p. 216, cited in Emmett E. Stobbs, "Tactical Nuclear Weapons: Do They Have A Role in U.S. Military Strategy?" Comparative Strategy , Vol. 13, p. 201.

152 Barry Blechman and Cathleen S. Fisher, "Phase Out the Bomb,"Foreign Policy , No. 97, Winter 1994-95, pp. 90 - 91, emphasis mine.

153 COL Stobbs, p. 201, emphasis mine.

154 See Stephen Budiansky, "Airpower's Ultimate Test," U.S. News and World Report, 28 January 1991, p. 28, cited in MAJ Vokac, p. 35.

155 See "Congress Increases Funding for Tactical Weapon R&D," Aviation Week and Space Technology , August 1, 1988, p. 18, cited in MAJ Vokac, p. 35.

156 Greene, Zwemer, and Woodford, p. 73.

SADARM/MLRS ACWs could achieve a 45 percent Non-Combat Available (NCA) kill at a cost of 10 - 14 million dollars at 250 rounds expended. On the other hand, two 15 kiloton nuclear weapons achieved the same 45 percentage NCA. The cost ratios for ACW systems to TNWs for the SS-21 Battalion target were 14:10:<7 for MLRS, SADARM, and TNWs, respectively.[157] Furthermore, to achieve a 90 percent NCA, only two more TNWs were required, while such a level of NCA was unattainable for ACW systems.[158]

In the abstract, considering the aspects of lethality, reliability, and cost, TNWs are the obvious military choice over ACWs. However, there are other issues to be considered as well. These other issues center around the degree of flexibility in use between the classes of weapons. Degree of flexibility refers to the likelihood that the weapon system will be available to commanders in the field in a manner which supports planning and execution of the types of military operations our forces are likely to undertake.

157 Ibid, p. 62.
158 Ibid, p. 60.

FLEXIBILITY

Comparisons of the deterrent value of TNWs versus ACWs reveal much about the likelihoods of release for the two categories of weapons. Those favoring conventional weaponry argue that "because conventional force does not carry the global, national, or personal taboos that nuclear weapons do, its use is far more likely and credible than the use of nuclear weapons in any crisis."[159] Proponents for ACW argue that while TNWs are clearly more powerful weapons, they are not more powerful deterrents, as their use is seen as so unlikely, that they cannot deter. "Few believed that the United States would use nuclear weapons in response to non-Soviet aggression, and American actions [in Korea, Vietnam, and Desert Storm] proved them right."[160] The RAND Corporation hosted a series of policy exercises in 1993, involving 200 participants drawn from executive agencies, Capitol Hill, the military services, journalists covering national security, and policy-research organizations in Washington D.C. The exercises revealed "a strong tendency for the U.S. to rely on conventional, rather than nuclear, means to extend military security guarantees to friends and allies."[161] Military necessity will probably not override this "strong tendency" towards self-restraint against nuclear weapons use.

Arguments emphasizing advanced conventional weaponry over tactical nuclear weaponry point to the greater flexibility of use in conventional firepower as making conventional firepower more "credible," because it is presumable more usable. Our "new conventional military capability adds a powerful dimension to the ability of the United States to deter war. While it is certainly not as powerful as nuclear weapons, it is a *more credible deterrent,* particularly in regional conflicts vital to U.S. national interests."[162] It is widely believed that the lower collateral damage associated with conventional weapons means that the United States is more likely to actually use them when military operations require it. "While tactical nuclear weapons

159 Allan, p. 211.
160 GEN Carl E. Vuono, US Army (Ret), "Desert Storm and the Future of Conventional Forces,"Foreign Affairs, Vol. 70, No. 2, Spring 1991, p. 50.
161 Millot, Molander, Wilson, p. xi.
162 William J. Perry, "Desert Storm and Deterrence," Foreign Affairs, Vol. 70, No. 4, Fall 1991, p. 66.

were perhaps considered weapons of last resort, smart weapons can be weapons of first resort."[163]

Concerning flexibility of use, Tactical Nuclear Weapons are at a severe handicap when compared to conventional weapons. The primary reason for this is that TNWs, like all nuclear weapons, require the approval of the President. Requests for tactical nuclear weapons use are generated in the field based on fire planning which takes place before the operation begins. Planners must anticipate the need for TNWs to support operations. Requests are generated at the division level in the form of OPLANs and passed through corps and theater headquarters to the National Command Authority.[164] Corps headquarters nuclear planning provides the nuclear targets and uses that would make up the target lists for approval by theater and higher headquarters. Corps requests for TNWs are approved by the President and that approval is transmitted back to the Corps Commander.

> "Decisions to employ tactical nuclear weapons will be matters of supreme significance and will be made by the National Command Authority taking into account, as appropriate, allied, military, and political recommendations."

Headquarters, Department of the Army, Deployment and Employment Policy for Tactical Nuclear Weapons, Office, Deputy Chief of Staff for Military Operations, 25 April 1973, p. 39.

The release of TNWs to the Corps Commander is limited to: a specified "package" of weapons of a number and yield designed to achieve the desired tactical effects, taking into consideration the potential collateral damage; specified period of time (several hours to a day); and only for the targets specifically approved.[165] The idea behind the "package" was meant to ensure that use of nuclear weapons would occur on a selective basis only, meaning that package would be approved separately, not one decision that would open up a "Pandora's box."[166] This request process can take up to 24 hours.[167] The Corps Commander is therefore required to

163 MAJ Vokac, p. 40.
164 HQDA, FM 71-100 Division Operations, pp. E-3 to E-6.
165 Anson, p. 28.
166 Midgely, p. 144.
167 Rose, p. 173.

identify the need for TNWs at least 22 to 46 hours in advance if they are to play a role.[168] "This relegated use of TNWs as pre-planned to identified contingencies."[169]

Kelleher, writing in 1987, noted that despite initiatives begun by the Reagan administration to introduce computers into units, real-time communications capabilities were still limited, and that Soviet doctrine placed great emphasis on interrupting or disrupting NATO command, control, and communications nodes.[170] In his book, published in 1991, Daalder commented that improvements in communications technology have reduced transmission times potentially resulting in a 50 percent reduction in the time required to process a request for TNWs.[171] However, even twelve hours is still too slow for the TNW to be considered a weapon which can be employed on the modern battlefield, characterized by rapid movements and changing tactical situations.[172] Even as late as February 1991, Army leaders were expressing concerns that the procedures for obtaining release authority had not been sufficiently streamlined to allow for timely use of TNWs.[173]

Adding to the frustration that the request sequence was time-consuming was the possibility that the request might be denied. The issue of whether Presidential release for tactical nuclear weapons use would be forthcoming when needed has been a troubling one for military planners who recognized that tactical nuclear use was overshadowed by the fear that even limited use would escalate into a central nuclear exchange. Writing in Strategic Review, Dowler and Howard doubted "that any President would authorize the use of nuclear weapons in our present arsenal against Third World nations." [174] In his paper, An Absence of Will, Navy Commander Hank Prevette argues that "the President will not approve the first use of nuclear weapons in Europe."[175] In a survey conducted at the Navy War College, Cdr Prevette found that 40 percent

168 MAJ William D. Brown, "Whatever Happened To...Tactical Nuclear Warfare,"Military Review, Vol. LX, No. 1, January 1980, p. 49.
169 Kelleher, pp. 66 - 67.
170 Ibid.
171 Daalder, p. 96.
172 Cannon, p. 62.
173 LTC Skelton, p. 32.
174 Dowler and Howard, p. 38.
175 CDR Hank Prevette, pp. 2-3.

of the senior ranking officers surveyed believed that the President would not authorize first use of nuclear weapons in Europe.[176] This indicates the lack of faith these senior military leaders had in obtaining Presidential release of nuclear weapons.

This doubt is supported by American history on the subject of nuclear weapons use. Occasionally, U.S. Presidents and their administrations have considered use of atomic or nuclear weapons. The Truman administration was considering the use of atomic weapons to end the Korean War in 1950, however when the British Prime Minister expressed his concern to President Truman on the issue, he received assurances that the bomb would not be used.[177] During the Eisenhower administration, the Joint Chiefs of Staff had drawn up plans for tactical use of atomic weapons in the event that the Chinese renewed hostilities in Korea to "inflict maximum destruction on enemy forces."[178] However, the likelihood that these plans would have received presidential approval seems doubtful in light of Eisenhower's subsequent actions in the French Indo-China war against the Viet Minh. When French paratroopers were besieged in Dien Bien Phu in 1953, low-yield atomic weapons were being considered by U.S. military planners to carry out air strikes against the Viet Minh. President Eisenhower, upon learning of such plans, responded "You boys must be crazy. We can't use those awful things against Asians for a second time in less than ten years. My God."[179]

Arguably, Presidents Truman and Eisenhower were the greatest advocates of atomic weapons in American history, and yet, when presented with opportunities to utilize them in accordance with the military situation, they declined to do so. During the Kennedy and Johnson administrations, there was probably very little chance that tactical use of nuclear weapons would have been approved, short of responding to Soviet use in Europe. Robert McNamara, Secretary of Defense and principal military advisor to both presidents wrote; "In long conversations with

176 Ibid, pp. 8-9.
177 Carl Kaysen, Robert S. McNamara, and George W. Rathjens, "Nuclear Weapons After the Cold War," Foreign Affairs, Vol. 70, No. 4, Fall 1991, p. 100.
178 From a recently declassified memo from the JCS, signed by Brigadier General Edwin H. Carns, Secretary to the Joint Chiefs of Staff, signed April 17, 1954, as quoted in the Associated Press article, "Ike Was Ready to Use Nukes on China," The Washington Times, 13 December 1994, as reproduced in ACDA News, of the same date, p. 12.
179 Stephen E. Ambrose, Eisenhower, New York, Simon and Schuster, 1983, Vol. 2, p. 184, as quoted in Kaysen, McNamara, and Rathjens, "Nuclear Weapons After the Cold War," p. 100.

successive Presidents - Kennedy and Johnson -- I recommended, without qualification, that they never initiate under any circumstances, the use of nuclear weapons. I believe they accepted my recommendation."[180]

Threats of nuclear weapons use by U.S. presidential administrations has also occurred. In 1975, concerned that the defeat of the Republic of Vietnam by the Communist North might prompt Kim Il Sung to attack the Republic of Korea, then Secretary of Defense James Schlesinger made a veiled threat to use nuclear weapons; "It is, I believe, known that we have deployed nuclear weapons in Europe and Korea along with our forces, and that those nuclear weapons are available as options for the President."[181] And of course, President Bush used the threat of nuclear weapons, in a letter to Iraqi leader Saddam Hussein published in the American press, to effectively deter Iraqi use of chemical and biological weapons in the Gulf War.[182] However, the credibility of that threat was called into question by remarks made by White House Chief of Staff John Sunnunu, who gave assurances that there was no likelihood of a resort to tactical nuclear weapons.[183]

Perhaps more than any other, the issue of flexibility of use has dominated the debate over substituting ACWs for TNWs. Technology can and has solved the problems associated with unwanted collateral damage through increased accuracy in delivery systems which allow for lower yields and through advances in nuclear weapons technology which allow for impressively "clean" tactical nuclear weapons. However, it seems that no matter how advanced TNW technology progresses, the issue is not going to be decided by military commanders on the merits and operational benefits TNWs can provide. As long as the taboo against nuclear weapons remains in American political culture, the military cannot rely on flexibility in using TNWs. Although TNWs seem to offer the "100 percent solution" to any tactical problem, the Army would likely prefer the "60 - 80 percent solution" that will be employable 100 percent of the time. Indeed, the Pentagon planners for Desert Storm were not attracted to the idea of using

180 McNamara, p. 79.
181 Blechman and Fisher, p. 80.
182 Bundy, p. 84.
183 Bundy, p. 87.

tactical nuclear weapons, finding it better "to rely on systems that they knew their commander in chief would let them use."[184]

ACW	TNW
*Discrete effects	*Pervasive throughout area
*Immediate effects	*Immediate plus delayed effects
*Usually more sensitive to target location error, delivery errors, counter-measures	*Usually less sensitive
*Less concern about collateral damage; more flexibility in use	*Use is tightly constrained
*Performance uncertain; subject to countermeasures	*High confidence performance
*Less cost effective in destroying large area targets	*More cost effective in destroying large area targets

Source; Greene, Zwemer, Woodford, p. 4

Table 1: Comparison of ACW and TNW

As the preceding table shows, TNWs are superior in performance, cost, and lethality. However, as has already been stated, as weapons of mass destruction, TNWs come with many strings attached that do not bind ACWs. Advanced conventional weapons "avoid the severe operational difficulties of nuclear explosives...they do not require the same degree of centralized command and control," and can be fired without worry of the "devastation" that accompanies nuclear weapons.[185] Having proved that TNWs were capable of achieving high percentages of unit destruction at lower cost than ACWs in every case they examined, Greene, Zwemer and Woodford admitted that "procedural and political limitations, including stringent and time-consuming procedures for nuclear release, make it unlikely that nuclear weapons can be employed effectively against mobile targets unless the targets halt and remain stationary for extended periods."[186] Modern warfare is not likely to be so cooperative.

184 Bundy, p. 87.
185 Alton Frye, "The High Risks of Neutron Weapons; The Neutron Bomb Risks," The Washington Post, July 17, 1977, p. B-1.
186 Greene, Zwemer, and Woodford, p. vi.

"Army tactical nuclear weapons provided a tremendous firepower capability for a corps commander. No other weapons offered as much battlefield potential for the Army, yet created so many seemingly unsolvable military, political, and moral problems for the United States and her allies which precluded its use."[187]

In summary, a comparison of the capabilities of ACWs and TNWs shows that the issue of substitution was decided terms other than military effectiveness. "It is clear that, despite early recognition of their potential, TNWs continue to be viewed as dangerous and highly unacceptable substitutions for conventional weapons, *even* if they should promise a less costly defense."[188] Despite their many promising attributes, Army leaders would probably rather the Army "have relatively inferior weapons it knows it can use, than better weapons it may not be allowed to use, and given our history, probably wouldn't be."[189]

187 MAJ Vokac, p. 39.
188 Drs. William Van Cleave and Samuel T. Cohen, Tactical Nuclear Weapons: An Examination of the Issues, p. 15.
189 Personal interview with Dr. William R. Van Cleave, 1 March 1995, Center for Defense and Strategic Studies, Springfield MO.

CHAPTER 3

THREATS

The future threat, against which the capabilities of TNWs would be needed, is likely to be an opponent armed with a mix of nuclear, conventional, chemical, and possibly biological weapons systems.[190] While the breakup of the former Soviet Union has reduced the likelihood of global nuclear war, significant major and regional powers now possess (or are suspected of possessing) nuclear weapons and other weapons of mass destruction (WMD) that may pose threats to U.S. forces; Russia, China, India and North Korea.[191] The list of threats is growing; "currently, more than 25 countries possess or are developing nuclear, chemical, or biological weapons, and more than 15 nations have ballistic missiles."[192]

The proliferation of ballistic missiles adds another dimension to the problem: "with WMD, even small-scale theater ballistic missile threats would raise dramatically the potential costs and risks of military operations, undermining conventional superiority and threatening the credibility of U.S. regional security strategy."[193] There are presently numerous regional threats in developing regions of the world. "By the year 2000 at least fifteen developing nations will be able to build ballistic missiles, eight of these countries may have nuclear weapons capability, thirty countries may have chemical weapons, and ten will be able to deploy biological weapons as well."[194]

These other weapons of mass destruction are important to the question of relevancy of TNWs, because the United States has renounced use of all but nuclear weapons. The United

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190 Carol A. Yarnall and James R. Caruthers, FUTURE LOOK: Volume IB, The Future World in Europe and Its Implications for the Security and Survivability of Non-Strategic Nuclear Forces, Sandia National Laboratories, Albequerque NM, June 1990, p. 12.

191 U.S. Intelligence agencies believe that North Korea has already produced "one or two crude bombs." See James Fallows, "The Panic Gap; Reactions to North Korea's Bomb," The National Interest, Winter 1994/95, No. 38, p. 41. See also, "North Korea's Bombs," The Wall Street Journal, 30 January 1995, as reprinted in ACDA News, of the same date, p. 10.

192 William J. Perry, Annual Report to the President and the Congress, 1995, p. 239.

193 William J. Perry, Annual Report to the President and the Congress, February 1995, p. 240.

194 Paul D. Wolfowitz, "The New Defense Strategy," in Rethinking America's Security, Eds Graham Allison and Gregory Treverton, New York, W. W. Norton & Co., 1992, p. 179.

States has renounced the use of biological weapons, agreeing not to develop, produce, stockpile, acquire, or retain biological agents or toxins that cannot be justified for peaceful purposes, in accordance with the Biological Weapons Convention ratified by Congress 22 January 1975.[195] In accordance with the Chemical Weapons Convention, also ratified by Congress, the Department of Defense (DOD) will destroy the U.S. chemical weapons stockpile and former production facilities by December 31, 2004.[196] "Since the United States has foresworn chemical and biological weapons, the role of U.S. nuclear forces in deterring or responding to such non-nuclear threats must be considered."[197]

RUSSIA

The Russian Army is still the only force capable of threatening the security of Western Europe. At present, "the Russian army is inadequate to deal with the American Army [conventionally]. The Russians have a tendency to overstate [Western] technological capabilities" and therefore feel more dependent upon TNWs as an equalizer to bridge the technology gap.[198] "Russian military scientists view nontraditional weapons and third-generation nuclear weapons as key elements of the MTR [Military Technical Revolution, known as a Revolution in Military Affairs (RMA) in the West]."[199] This view of "nontraditional weapons" excludes chemical weapons as Russia has vowed to destroy its chemical weapons stockpile, the largest in the world at 40,000 tons.[200] Regarding the utility of next-generation

195 Combined Arms and Services Staff School, Combined Arms Operations Volume One of Three Volumes, 1992, p. 145.
196 William J. Perry, Annual Report to the President and the Congress, 1995, p. 76. See also John D. Holum, Director, U.S. Arms Control and Disarmament Agency, remarks to an ABA Seminar, 7 February 1995, on Implementing the Chemical Weapons Convention, "The CWC: Time For The Harvest," ACDA News, 10 February 1995.
197 Office of the Secretary of Defense, Annual Report to the President and the Congress, 1994, as quoted in Theresa Hitchens, "U.S. Mulls Nukes To Counter Chemical, Biological Attack," Defense News, March 14-20, 1994, p. 7.
198 Remarks of Dr. Peter Pry during a seminar at the Center for Defense and Strategic Studies, 30 March 1995, Springfield MO.
199 Mary C. Fitzgerald, "The Russian Image of Future War," Comparative Strategy, Vol. 13, No. 2, April-June 1994, p. 167.
200 The Associated Press, "Yeltsin Orders Russia's Stockpile of Chemical Weapons Destroyed," News Leader, Springfield MO, March 1995.

low-yield, specially designed nuclear weapons, V. N. Mikhaylov, Russian Minister for Atomic Energy, has argued that they would be usable "in any conflict."[201] The Russians see U.S. modernization of its nuclear arsenal, its present lead in conventional force capabilities, and a lead in emerging technologies as solid reasons to rely on TNWs. Additionally, the Russians strongly support maintaining a TNW stockpile in order to provide it the capability of defeating China's two and a half million man army, if necessary.[202] Of course, such a capability would affect Russian posture in Europe as well as Asia.

The Russian military, having witnessed American use of ACWs to destroy Iraq's infrastructure and command and control facilities, view U.S. ACWs to be a threat to their nuclear power stations, chemical plants and other environmentally hazardous installations. Accordingly, the new Russian military doctrine says that an attack on any of these facilities would be seen as "the beginning of a nuclear attack on Russia itself, and would therefore justify a Russian nuclear retaliation."[203]

When the Western Alliance faced the prospect of being overrun by the Warsaw Pact, we favored early use of TNWs. TNWs were seen as an equalizer to match the superior conventional forces of the Warsaw Pact. Oddly, the roles are now reversed, the Russians are now more reliant than ever on nuclear forces and are emphasizing first use of nuclear weapons in any conflict with the West.[204] George Quester saw the preference for nuclear weapons as a natural consequence of conventional inferiority; "whoever has the advantage in conventional forces should be against nuclear escalation...while whoever is badly threatened by the conventional balance might wish to introduce the threat of nuclear escalation."[205]

However, the Russian doctrine may be merely an extension of Soviet beliefs on nuclear weapons use. Regarding the Russian/ Soviet threat, former Secretary of Defense, Les Aspin

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201 Fitzgerald, p. 173.
202 Mazaar and Lennon, p. 208.
203 Ibid.
204 from remarks made by Dr. Peter Pry during a seminar held at the Center for Defense and Strategic Studies, 30 March 1995.
205 George H. Quester, "The Future of Nuclear Deterrence," Survival, Vol. 34, No. 1, Spring 1992, p. 84.

stated that "those guys were going to go to nuclear weapons right from the outset."[206] The Soviets viewed nuclear weapons as a "powerful and effective means of tactical combat."[207] Soviet doctrinal literature indicated that the Soviets were planning to use TNWs to support tactical operations; "The path of advance of the troops will be cleared by nuclear weapons;"[208] "nuclear missile weapons have become the basic means of destroying the enemy in operations."[209]

The Russian army maintains a credible, TNW capability, has a history of nuclear weapons emphasis, has expressed a doctrine for their use, and perceives threats which require it to maintain that capability into the future. The Russians maintain the capability to deliver nuclear fires by artillery, missile, and aircraft, and continue to train their soldiers for combat in a nuclear environment. Russia has some 600 launchers for rockets (FROG) and missiles (Scud-B/C), 323 203mm and 776 152mm howitzers all capable of delivering TNWs.[210] In short any force going up against the Russian army would face a formidable tactical nuclear threat.

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[206] Remarks by Les Aspin at a symposium at Marquette University, 19 April 1995, as quoted in Joe Williams, "Avoiding Nuclear War was a Miracle," Milwaukee Journal-Sentinel, 21 April 1995, p. 25.

[207] Joseph D. Douglass Jr., The Soviet Theater Nuclear Offensive, A report prepared for the Office of the Director of Defense Research and Engineering and the Defense Nuclear Agency, Vol. I, p. 3.

[208] Lieutenant General I. Zavyalov, "Nuclear Weapons," Ed. A. A. Sidorenko, The Offensive, Translated and published by the U.S. Air Force, USGPO, Washington D.C., 1973, p. 49.

[209] Colonel General N. A. Lomov, The Revolution in Military Affairs, Translated and published by the U.S. Air Force, Washington D.C., USGPO, 1974, p. 142.

[210] The International Institute for Strategic Studies, The Military Balance 1994-1995, London, Brassey's, October 1994, p. 113.

CHINA

China is reported to have TNWs deliverable by missile, artillery, and aircraft with yields in the 10-30 kt range.

The Chinese had sufficiently miniaturized their nuclear warheads for delivery by fighter-bombers such as the F-9 by the late 1970s.[211] In the PLA, there are estimated to be about 400 203 mm guns with 5 kt nuclear warheads and some 152 mm guns with 1 kt warheads, distributed in 90 artillery battalions under 20 field artillery divisions stationed along the East Sea coast and the Russian border.[212] China maintains approximately 80 or less short-range ballistic missiles (SRBMs), the DF-15 (aka M9), with 100 or less nuclear warheads, as well as 350 to 400 nuclear gravity bombs with 20 kt to 3 mt yields deployed since 1965,[213] and an unknown number of 10 kt TNW gravity bombs for delivery by F-9 fighter-bombers.[214] In addition to the artillery SRBM and gravity bomb capabilities, China has various surface to air missiles which could also carry 1-2 kt nuclear warheads.[215] At present, China's nuclear arsenal is estimated by some to be larger than those of the United Kingdom and France combined in terms of megatonnage.[216] The Chinese see TNWs as necessary to defend against a Russian attack and have "actively formulated a tactical nuclear doctrine" which addresses not only defensive measures against enemy use of TNWs, but also offensives by PLA units employing TNWs.[217]

China was impressed by the technological edge Coalition forces held in the Gulf War and is attempting to modernize its conventional forces and improve its power-projection capabilities. China recently acquire, missile guidance technology, and sophisticated S-3000 (SA-10) surface-to-air missiles from Russia, improving its ballistic missile and anti-aircraft capabilities.[218] The

211 Chong-Pin Lin, China's Nuclear Weapons Strategy, Lexington MA, Lexington Books, 1988, p. 80.
212 Lin, pp. 88 & 89.
213 John C. Hopkins and Weixing Hu, Strategic Views from the Second Tier: The Nuclear Weapons Policies of France, Britain, and China, University of California Institute on Global Conflict and Cooperation, p. 272.
214 Lin, pp. 75-89.
215 Ibid.
216 Jonathan Power, "Asia's Nuclear Arms Race,"The Sun, 27 January 1995, as reprinted in ACDA News, of the same date, p. 6.
217 Lin, p. 87.
218 Takayoshi Sogo, "China's Arms-Buying Spree Has Neighbors Concerned,"Asian Defence Journal, December 1992, p. 92.

PLA has formed rapid reaction forces known as "Fists," which have conducted joint and combined arms exercises simulating the capture of "enemy" islands in the South China Sea.[219]

China has sovereignty disputes with Vietnam, Taiwan, Brunei, Malaysia, Indonesia, and the Philippines over the Spratly Islands; with Japan and Tawain over the Senkaku Islands; and with Vietnam and Tawain over the Paracel Islands. China's new power projection capabilities and aggressive occupation of many of the islands is a source of past and potential future conflict in the region.[220]

In view of China's disputes with its neighbors, improving conventional force-projection capabilities, and growing nuclear capabilities, U.S. defense planners will increasingly have to weigh China's ability to impact our power projection into Southeast Asia.[221]

REGIONAL THREATS

"The proliferation of weapons of mass destruction dramatically alters the nature of regional conflict. As these weapons proliferate, the likelihood of their use against friendly forces or in response to an enemy's first use increases."[222] In addition to the obvious major nuclear powers are a growing group of regional powers seeking WMD and ballistic missile capabilities. Third world armies have learned a lesson from Desert Storm: the U.S. Army is competent in fighting its conventional doctrine. However, they have also learned from the Vietnam War that they can succeed by attacking our strategy. Regional powers fearing U.S. harassment or intervention in their percieved area of influence will attack U.S. strategy and will avoid at all costs having to fight a conventional war. Most of the world's armed forces are going to be looking for equalizers, which include WMD.

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219 Philip L. Ritcheson, "China's Impact on Southeast Asian Security," Military Review, Vol. LXXIV, No. 5, May 1994, p. 46.

220 See Michael Richardson, "Spratlys Increasing Cause for Concern," Asian Defence Reporter, October-November 1992, p. 37. Concerning the Paracel Islands dispute, see Kenneth Conboy, "The Future Southeast Asian Security Environment," Strategic Review, Summer 1992, p. 37. Concerning the Senkaku Island dispute, see Mark J. Valencia, "Insular Possessions," Far Eastern Economic Review, 28 May 1992, p. 23.

221 Stobbs, p. 200.

222 HQDA, FM 100-5: Operations, 1993, p. 6-10.

Our opponents will also consider weapons based on other technologies, primarily chemical and biological. Chemical weapons often called "the poor man's nuclear bomb," are attractive to rogue states because "they are cheap to produce and don't demand the kind of elaborate technological infrastructure required for nuclear weapons."[223] A civilian pesticides manufacturing capability can quickly be transformed into a chemical weapons production capability. The same holds true for biological weapons. "Any nation with the will and resources can convert its legitimate nuclear, medical, and pharmaceutical or chemical facilities to the production and development of NBC weapons."[224]

The threat from biological weapons is significant: "biological agents can cover an area larger than all other weapons."[225] While the recent sarin nerve agent attack on a Tokyo subway on March 20, 1995, killed seven and injured more than 5,000, biological weapons could have increased those numbers tenfold. A 1993 study by the Congressional Office of Technology Assessment said that a Scud missile carrying anthrax could kill 100,000 people in a city like Washington D.C., "more than an atomic warhead like the one dropped on Hiroshima."[226] Potential antipersonnel biological agents consist of living microorganisms such as fungi, bacteria, rickettsias, and viruses.[227] Biological weapons are easy to make and easier to smuggle than other weapons of mass destruction and several countries are believed to be pursuing a biological weapons capability.[228]

Even nuclear weapons technology can proliferate to regional powers as India, North Korea, and Iraq have amply proven. North Korea had a well concealed nuclear weapons development program in hardened and geographically separated sites all the while in apparent

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223 John D. Holum, Director of U.S. Arms Control and Disarmament Agency, remarks to an ABA seminar on Implementing the Chemical Weapons Convention, 7 February 1995, "The CWC: Time For The Harvest,"ACDA News, 10 February 1995.
224 Col. John A. Mojecki, "Mission-Essential Training and Weapons of Mass Destruction,"Military Review, Vol. LXXIV, No. 10, October 1994, p. 91.
225 HQDA, FM 3-87: Nuclear, Biological, and Chemical (NBC) Reconnaissance and Decontamination Operations, Washington D.C., 22 February 1980, USGPO, p. 1-4.
226 Jeff Erlich and Pat Cooper, "Biological Weapons Put World On Edge,"Army Times, April 10, 1995, p. 26.
227 HQDA, FM 3-87: Nuclear, Biological, and Chemical (NBC) Reconnaissance and Decontamination Operations, p. 1-4.
228 Ibid.

compliance with the Non-Proliferation Treaty (NPT). According to some accounts, Iraq was within a year of two of having nuclear weapons when it invaded Kuwait in 1990.[229] Iraq was a "member in good standing" in the NPT, and yet was able to conceal its nuclear weapons program, which until its defeat by UN coalition forces, was not fully appreciated until the UN-appointed special commission to dismantle it discovered its true dimensions.[230] It is clear now "that the Iraqi dictator had more fissionable material at his disposal than the U.S. had ever suspected."[231]

NORTH KOREA

North Korea's military strategy is to strike quickly, sweeping the entire peninsula with mechanized troops and armor supported by self-propelled artillery before the additional deployment of more U.S. troops.[232] North Korea has amassed some 3,700 main battle tanks, 500 light tanks, and 2,500 armored personnel carriers in its one million man army.[233] North Korea's military manpower is 1.6 times greater than that of South Korea, with twice as much hardware.[234] Sixty-five percent of its ground forces, 60 percent of its ships, and 40 percent of its aircraft are forward deployed south of the Pyongyang-Wonsan line.[235]

North Korea has since the 1960s been pressing forward in developing a chemical and biological weapons capability, producing from its eight chemical weapons factories large quantities of blister and tear gasses and nerve, blood, and choking agents.[236] North Korean delivery systems capable of carrying chemical weapons include mortars, field artillery, multiple-

229 Zachary S. Davis, U.S. Counterproliferation Doctrine: Issues for Congress, Congressional Research Service, The Library of Congress, Washington D.C., 21 September 1994, p. 3.
230 Ibid, p. 3.
231 Bundy, p. 89.
232 The Ministry of National Defense of The Republic of Korea, Defense White Paper 1994-1995, translated and published by the Korea Institute for Defense Analysis, 1995.
233 The International Institute for Strategic Studies, p. 178.
234 "The South's Military Preparations," Intelligence Digest, 7 October 1994.
235 Ibid.
236 Republic of Korea National Ministry of Defense, p. 70.

launch rocket systems, the Frog-5 and Frog-7 rockets, and Scud missiles. North Korea is estimated to be able to produce 100-150 Scud-B missiles per year.[237]

THE MIDDLE EAST

The Middle East has experienced dramatic proliferation of both conventional and unconventional weaponry. This proliferation has resulted "in piling up military equipment in Middle Eastern arsenals approaching both in quality and quantity the totality of that assigned to NATO."[238] Ten Islamic nations have ballistic missile capabilities; Libya, Iran, Iraq, Yemen, Syria, Unite Arab Emirates, Pakistan, Afghanistan, Saudi Arabia, and Egypt. And while some of these nations are friendly to the U.S., the Middle East has seen conflict after conflict almost non-stop since the end of World War II. Ballistic missiles have seen wide use in the Middle East, most recently in exchanges of conventionally armed Scud missiles between North and South Yemen.[239]

Chemical weapons use in the Middle East dates back to the early 1960s when Egyptian expeditionary forces made sporadic, but escalating use of chemical bombs against royalist tribesman supporting the monarchy of what would later become North Yemen. One of the chemical attacks killed more than 100 royalists in January 1967.[240] Middle-Eastern states with known or strongly suspected chemical weapons programs that could pose a threat to U.S. contingency forces include Iraq, Syria, Iran, and Libya.[241]

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237 Republic of Korea National Ministry of Defense, p. 71.
238 George Ball, "The Hard Realities of the Arab-Israeli Conflict," Rethinking America's Security, Eds Graham Allison and GregoryTreverton, New York, W. W. Norton & Co., 1992, p. 355.
239 William J. Perry, Annual Report to the President and the Congress, 1995, p. 241.
240 W. Andrew Terrill, "The Chemical Warfare Legacy of the Yemen War," Comparative Strategy, Vol. 10, No. 2, April-June 1991, p. 109.
241 Ibid, p. 109.

IRAQ

Iraq, our most recent foe in the Gulf War, has used chemical weapons and ballistic missiles successfully in combat. The Iraqis successfully panicked an entire Iranian division with tear gas during the Iran-Iraq war. Later in the war, Iraq used domestically produced lethal chemicals to break up the Iranian "human wave" attacks. By the August 1988 ceasefire, the Iranians had also used World War I type agents against the Iraqis.[242] The Iraqi military used chemical weapons against its own people, attacking Kurds with poison gas in the village of Halabja in the late 1980s.[243] The potential for Iraqi use of chemical weapons caused many U.S. commanders to place their forces in higher levels of Nuclear Biological and Chemical (NBC) protective posture thus impairing operations.

Iraq of course has used ballistic missiles in war, first in the "war of the cities" in the Iran-Iraq War where both Iran and Iraq exchanged Scud missiles, and later in the Gulf War against Israeli civilians and Coalition forces. In the Gulf War, Iraq launched some Scuds within Iraq as a demonstration, and a further 78 Scud missiles against Israel and Coalition targets in Saudi Arabia.[244] Ultimately, one conventionally armed Iraqi Scud missile caused 25 percent of U.S. combat fatalities in the Gulf War.[245] The specter of chemically armed Scuds caused the Israelis to don gas masks and retreat into sealed shelters as the world watched it all on television.

The Clinton administration has stated "we now have strong evidence that Iraq is conducting a large program to develop biological weapons for offensive purposes."[246]. The Iraqis have been pursuing such a capability since the late 1980s, when work began on ways of using a range of bacteria and viruses as weapons, including anthrax, botulism, gas gangrene, and

242 Ibid, p. 117.
243 William Safire, "Iraq's Threat: Biological Warfare," The New York Times, 16 February 1995, as reprinted in ACDA News, of the same date, p. 8.
244 Mazzia, p. 76.
245 Keith B. Payne, "Post-Cold War Deterrence and Missile Defense," Orbis, Vol. 39, No. 2, Spring 1995, p. 202.
246 Secretary of State Warren Christopher as quoted in the Associated Press, "Christopher Lashes Iraq and Iran," News Leader, Springfield MO, 5 April 1995, p. 10A. See also Cheryl Whitsitt, "U.N. Council to Address Iraqi Germ Warfare," News Leader, 12 April 1995, p. 2A.

rabbit fever.[247] Iraq has been secretive about its biological weapons program, but more evidence has surfaced that cholera, tuberculosis, and the plague are under development as weapons agents.[248] Reports from a defecting Iraqi General indicate that Iraq may have up to 80 Scud and Al Hussein Scud missiles and 200 biological anthrax bombs hidden away from UN inspectors.[249] Given Saddam's decisions to use environmental terrorism in the Gulf War, Iraq is a prime candidate to introduce biological weapons.

American intelligence agencies confirm the suspicion that Iraq "may be hiding equipment and material" for weapons of mass destruction and that it is "rebuilding its military infrastructure at a surprising pace."[250] Iraq has approximately 2,200 main battle tanks, 700 infantry fighting vehicles, and perhaps 2,000 armored personnel carriers still in service despite the pounding inflicted by Coalition forces.[251] Israeli officials believe that Iraq is capable of reviving its nuclear program, and so might one day present a nuclear threat as well.[252] Iraq continues to pose a credible military threat to any future U.S. contingency forces operating in the Persian Gulf area.

247 Alan George, "Fears of Iraqi Biological Weapons Don't Abate,"The Washington Times, 24 December 1994, as reprinted in ACDA News, of the same date, p. 6.
248 "Biological Weapons Program in Iraq Larger Than Believed," Los Angeles Times, February 28, 1995, as reprinted in ACDA News, of the same date, p. 8.
249 "Iraq Said to Hide Germ-Tipped Missiles," The Washington Times, 21 February 1995, p. A13, as reprinted in ACDA News, of the same date, p. 12.
250 William Matthews, "Iran, Iraq Back In Their Troublemaking Roles," Army Times, 3 April 1995, p. 11.
251 The International Institute for Strategic Studies, p. 130.
252 Nicolas B. Tatro, "Iran Gains Ground In Drive For Nukes,"The Washington Times, 6 January 1995, as reprinted in ACDA News of the same date, p. 5.

IRAN

Iran is pursuing improvements in its conventional and unconventional military capabilities, to include ballistic missile, chemical, and nuclear weapons. Iran currently possess the Scud-B, Scud-C, Nazeat, CSS-8, and Frog 7 missiles. Iran has been assembling Scud-Bs with imported parts, however, the Iranians will soon be able to produce these Scud-Bs with a significant portion of locally manufactured parts.[253] Iran is believed to have been involved in funding the North Korean development of the *No Dong* SSBM which is expected to have a range that would just reach Israel from firing positions in Iran.[254] The *No Dong* has a critical error of probability (CEP) of 2-4 km, which, if Iran were to acquire it, would give Iran a counter-value weapon that is a prime candidate for carrying WMD due to its poor accuracy.[255] Additionally, Iran is working on its own cruise missile, modeled after the Chinese Silkworm anti-ship missile.[256]

As has already been stated, Iran has used World War I type chemical agents in battle against the Iraqis. Furthermore, German intelligence reports have surfaced indicating that Iran is only months away from completing a secret poison gas complex.[257]
U.S. military planners have noted with concern the growing Iranian military buildup at the mouth of the Persian Gulf, including the deployment of 6,000 troops and *chemical weapons* to islands claimed jointly by Iran and the UAE.[258]

Iran's military buildup, which already includes ballistic and cruise missiles and chemical weapons, may also include a nuclear component in the future. Dr. Shahram Chubin believes that Iran is within five years of acquiring a nuclear weapon.[259] Unnamed U.S. officials estimated

253 Alan George, "Iran Puts Together Scud-B Missiles," Washington Times, 3 December 1994, as reprinted in ACDA News, of the same date, p. 11.
254 Tatro, p. 5.
255 Shahram Chubin, "Does Iran Want Nuclear Weapons?" Survival, Vol. 37, No. 1, Spring 1995, p. 93.
256 Iran has Chinese supplied Silkworm missiles which have a 48 mile range and looks and performs like a pilotless aircraft. See Alan, p. 11.
257 "U.S. Skirts Comment On Iranian Gas Complex," Washington Times, 1 February 1995, p. A15.
258 Douglas Jehl, "U.S. Says It's Worried About Iranian Military Buildup in Gulf," The New York Times International, 23 March 1995.
259 Chris Hedges, "Iran May Be Able to Build Atomic Bomb in 5 Years, U.S. and Israeli Officials Fear," The New York Times, 5 January 1995, as reprinted in ACDA News, of the same date, p. 1. See also Tatro, p. 5.

that Iran is spending $1.5 billion annually in its efforts to acquire a nuclear weapons arsenal.[260] Russian plans to provide assistance in completing the Bushehr nuclear reactor and training for Iranian nuclear engineers has added to the concern that Iran is well on its way towards acquiring a nuclear weapons capability.[261]

LIBYA

The U.S. Navy and Air Force have already tangled with Libya once before.[262] Libya is one of the ten Islamic nations now possessing ballistic missile capabilities. Libya, along with Syria, and Egypt, is suspected of developing a chemical weapons capability.[263] Libya is working hard to acquire chemical weapons as construction of a huge chemical weapons plant at Rabta, south of Tripoli is a reflection of this commitment.[264] Libya is also believed to be seeking a biological weapons capability, and has tried to lure South Africans involved in that country's now defunct chemical and biological weapons program to Tripoli to develop a Libyan program.[265] While the Libyan army can field 2,350 main battle tanks, of which 750 are T-62/T-72, 1,040 armored personnel carriers, and 1,000 infantry fighting vehicles, its primary threat to U.S. contingency forces would probably those delivery systems (approximately 40 FROG-7 rockets and 80 Scud-B missiles) capable of carrying the WMD it is trying to develop .[266]

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260 Charles W. Holmes, "Iran Nuclear Plant Gets Russian Boost," Washington Times, 12 February 1995, as reprinted in ACDA News of the same date, p. 8.
261 Reuters News Agency, "Russia Might Build Four Reactors For Iran,"The Washington Times, 21 February 1995, p. A13, as reprinted in ACDA News, of the same date, p. 12.
262 US Navy aircraft shot down two Libyan Mig fighters over the Gulf of Sidra and Air Force FB-111s bombed targets in Tripoli in the 1980s.
263 Terrill, p. 109.
264 Ibid, p. 117.
265 See the remarks of Nelson Mandela, Prime Minister of South Africa, as quoted in "Chemical-Arms Experts May Be 'Visiting' Libya,"The Washington Times, 3 March 1995, p. A19. See also, James Adams, "South Africa: Libya Said Seeking Secret Biological Weapons,"The Sunday Times, 28 February 1995, as reprinted in ACDA News of the same date, pp. 3 & 4.
266 The International Institute for Strategic Studies, p. 144.

CHAPTER 4

WHY THE U.S. NEEDS TACTICAL NUCLEAR WEAPONS

A credible tactical nuclear warfighting capability is a vital component of any national military strategy since it is a direct deterrent to enemy use of its own TNWs or other WMD. Beyond this direct deterrent, TNWs provide options throughout the spectrum between non-nuclear conflict and strategic nuclear weapons use. "Tied to credible conventional forces on the one hand and strategic attack forces on the other, tactical nuclear forces provide a link in a chain of deliberate escalation."[267] The threats outlined in the previous section require a convincing WMD deterrent.

As we saw in the first section, our present deterrent strategy is primarily based on the destructive power and accuracy of ACWs. Mazarr and Lennon, while acknowledging that a large difference existed in the deterrent effect between TNWs and ACWs, noted that NATO does not face a threat on an order that would make that difference significant.[268] Even if this argument is to be believed, stopping an armored thrust across the German central front is not the only deterrent role TNWs can play.

The primary deterrent purpose of TNWs has been to deter enemy use of his nuclear weapons or other weapons of mass destruction, including chemical and biological weapons.[269] It is doubtful that ACWs will be as effective in this deterrent role as were TNWs. Support for continued reliance on TNWs is given in the following arguments presented by Allan in the Korean case, which has relevance for other regional threats;

- The vast destructiveness of nuclear weapons and the inability to defend against them makes it easy to communicate their effect even to the most desperate opponents.
- The retrenchment of U.S. forces makes nuclear weapons essential to maintaining an extended nuclear deterrence and discouraging WMD proliferation.

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267 See HQDA, Deployment and Employment Policy for Tactical Nuclear Weapons, p. 7.
268 Mazaar and Lenon, p. 41.
269 Arnold Kanter, Nuclear Modernization and Arms Control in NATO, Santa Monica CA, the RAND Corporation, December 1988, p. vi.

- Nuclear weapons are essential for reassuring regional allies faced by significant conventional or WMD threats.[270]

In Europe, TNWs constitute an insurance policy against change for NATO. Secretary of Defense William Perry, said in announcing the results of the NPR that the United States needed to retain nuclear weapons to "hedge against a reversal of reform in Russia."[271] TNWs provide an "ace in the hole" guarantee that an attacking army can be stopped, and therefore provide a deterrent capability beyond the now reduced threat we face today. It is essential to maintain a TNW capability in Europe, for if circumstances change dramatically, it would be difficult to reintroduce TNWs. "Forward deployment [of TNWs] avoids provocative weapons movement in times of tension, and reduces potentially critical logistical problems in a crisis situation."[272]

Before "we remove or weaken this insurance policy we should be confident that we are fully justified - if we are justifying TNF [tactical nuclear forces] withdrawal on the basis of substitution by conventional forces we should thus insist on high confidence that the substitute is sufficient."[273] TNWs "will have to be retained for the foreseeable future, regardless of developments in ET [Emerging Technologies] or expenditures on conventional defense."[274] Kanter emphasizes that in the role of deterring an aggressor from resorting to WMD, "conventional weapons of equal capability and effectiveness cannot substitute."[275]

Western contingency forces are most vulnerable during the initial entry and force buildup phases of any force-projection contingency operation. Ballistic missile proliferation means that Third World nations are extending their reach, reducing our reaction times, and creating complex planning and decision criteria for force projection operations. "Western contingency forces will confront opponents capable of striking rapidly at cities, seaports, airports, and troop concentrations with nuclear, chemical, and biological weapons."[276] Future opponents might not

270 Allan, p. 214.
271 William J. Perry as quoted in Stephen A Cambone and Patrick J. Garrity, "The Future of U.S. Nuclear Policy," Survival, Vol. 36, No. 4, Winter 1994-95, p. 74.
272 HQDA, Deployment and Employment Policy for Tactical Nuclear Weapons, p. 15.
273 Biddle, p. 27.
274 Ibid, p. 8.
275 Kanter, p. vi.
276 Payne, p. 206.

allow U.S. forces to buildup forces unopposed, as was the case in Desert Shield. "They will ask how the United States would have fared [in Desert Shield] had it come under unconventional weapons attack, especially during the critical early weeks of the deployment."[277] Army doctrine warns that "a virtually defeated enemy may resort to unrestrained warfare by any means at hand."[278] Tactical nuclear weapons can provide a force multiplier capability for initial entry forces, "and an economy of force enhancement in a warfighting role in contingency operations against nuclear-capable, irrational (or undeterrable) actors."[279]

Iraq's overwhelming advantage during the initial periods of Desert Shield was of great concern to U.S. military planners. The 82d Airborne Division, deployed to form the "line in the sand" was being referred to within the Army as a "speed bump in the desert," due to its relative inferiority to the Iraqi armored and mechanized threat poised on the Kuwaiti-Saudi border. General Fred Kroesen made the case that TNWs would prevent risking the loss of an initial entry force (as American forces were lost on Bataan) or being forced to attempt a rescue operation (another Dunkirk), he used the 82d Airborne in Saudi Arabia as an example.[280] Had that force been in danger of being over-run, the American people would probably have insisted upon tactical nuclear weapons use to prevent their defeat.[281] The presence of U.S. TNWs in the theater of operations might "dissuade the [enemy] from continuing his aggression where the conventional force capabilities of the newly arrived U.S. forces might not."[282] An irrational leader like Saddam Hussein might not be deterred from using WMD by a strictly conventional opponent. The implied use of tactical nuclear weapons would unquestionably reflect the strongest political and military resolve of the United States.

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277 Wolfowitz, p. 179.
278 HQDA, FM 100-5: Operations, 1993, p. 6-10.
279 Stobbs, p. 197.
280 GEN Federick J.Kroesen, "Limbo Statuse of Tactical Nukes Leaves Serious Readines Gap,' Army Magazine, May 1991, p. 13, as cited in Jeb Stewart, The U.S. Army's Early Search for Relevancy in the Nuclear Age, Masters Thesis presented to the Graduate Faculty of the Department of Defense and Strategic Studies, Southwest Missouri State University, Springfield MO, April 1993, p. 162.
281 Ibid, p. 203.
282 Dowler and Howard, p. 38.

Mazaar and Lennon argue that "any deterrent threats, or actual strikes with nuclear weapons, in regional conflicts can be accomplished with strategic weapons [ICBMs]."[283] The Clinton Administrations Counter-Proliferation Initiative has also hinted that single warhead ICBMs could also play a regional role formerly ascribed to TNWs on shorter range missiles.[284] Additionally, Enthoven proposed that aircraft delivered TNWs could be replaced by 3 or 4 Poseidon submarines with MIRV warheads, arguing that aircraft were vulnerable on the ground to surprise strikes, and in the air to air defense artillery systems. Both of these arguments are false. Strategic weapons are too large, too destructive, and politically too difficult to use in response to an enemy who has employed nuclear, chemical, or biological weapons against U.S. forces. Dr. Pry points out that this approach could never work, as the Russians are far too nervous about intercontinental systems.[285]

Arguments against TNWs and favoring ACWs center around three themes; U.S. deployment of TNWs would be a setback for counterproliferation strategies, ACW capabilities allow for effective deterrence without crossing the nuclear firebreak, and domestic political constraints would prevent the United States from using nuclear weapons first.[286] Zachary Davis proposed that "some tactical nuclear weapons might contribute to a credible counter-proliferation posture and thus enhance deterrence...the capability to deliver smaller-yield nuclear weapons using air and sea-launched cruise missiles, nuclear capable aircraft (F-16s and F-111s), and perhaps innovative delivery systems might convince potential proliferators that the costs of acquiring or using nuclear weapons would far outweigh the benefits."[287] Colonel Stobbs points out that "it is difficult to establish a national linkage between nuclear proliferation and U.S. possession of, or planning for use of, TNWs."[288] Regarding the firebreak, use of mini-nukes and micro-nukes of yields of about 1,000 tons would provide weapons with lethal radii of 500 to

283 Mazaar and Lennon, p. 65.
284 See Cambone and Garrity, p. 89.
285 Dr. Peter Pry, from remarks made during a seminar at the Center for Defense and Strategic Studies, 30 March 1995, Springfield MO.
286 See Blechman and Fisher, pp. 88-90.
287 Davis, p. 12.
288 Stobbs, p. 203.

600 meters against infantry and armor targets, hardly qualifying as "indiscriminate weapons of mass destruction."[289] Given the new cooperation between Russia and the United States, use of such low-yield TNWs against regional powers would probably not ignite escalation to nuclear war between those two countries. Concerning domestic political constraints which would prevent the United States from engaging in first use, many nations do not have a public opinion which can prevent its leaders from using WMD. Against those foes, the United States needs a TNW capability to deter them from using their weapons of mass destruction. If that deterrence fails, the American public might be shaken enough by enemy use of WMD on American troops to support the use of TNWs in response if necessary.

As Dr. Gray pointed out, Third World armies are seeking equalizers to defeat Western contingency forces. For some, this

equalizer will be a nuclear weapon, for most, chemical and or biological weapons. Chemical and biological weapons, if even they are not effective in producing casualties, can have a significant impact on the outcome of any major operation or campaign. Observations from the U.S. Army's combat training centers show that the introduction of NBC agents into training scenarios contribute to mission degradation or mission failure. "To achieve the same objective, operations under NBC conditions require more combat power than operations not under NBC conditions."[290]

An opponent of U.S. contingency forces would be sorely tempted to use chemical weapons to handicap U.S. combat power and level the playing field. Such use would not necessarily have to be offensive in nature: chemical agents were used defensively in World War I to secure flanks and deter attacks across contaminated ground. All aspects of combat operations become unbelievably difficult in an NBC environment. The Army's Combined Arms in a Nuclear/Chemical Environment (CANE) tests showed clearly that unit performance was

289 Dowler and Howard, p. 38.
290 Major General Robert D. Orton, (US Army) and Major Robert C. Neumann, (US Army), "The Impact of Weapons of Mass Destruction on Battlefield Operations,"Military Review, Vol. LXXIII, No. 12, December 1993, pp. 64-72.

degraded in operations under NBC conditions. In operations conducted in full chemical protective suits it was noted that:

- Attacks and engagements lasted longer.
- Fewer enemy forces were killed.
  - _ Friendly forces suffered more casualties.
  - _ Friendly forces fired fewer rounds at the enemy.
- Fratricide increased.
- Terrain was used less effectively for cover and concealment.[291]

> In an NBC environment, battle command becomes more difficult. Command posts and headquarters at all levels are likely targets. Control will be difficult even with the smallest unit. Personnel in protective clothing will be slow to respond to rapid changes in mission. The employment of these weapons will greatly alter the tempo of combat."
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> FM 100-5: Operations, 1993, p. 6-10.

During Desert Shield/Desert Storm, U.S. policymakers were forced to consider what actions would be appropriate if Iraq were to use nerve agents against Coalition forces. Because the United States does not maintain an operational stockpile of chemical weapons, retaliation in-kind would not be an option today. Our defensive measures are effective, and are seen by some to be an effective deterrent to enemy use of Chemical-Biological Weapons (CBWs).[292] However, if the enemy is merely trying to slow down our optempo, handicap our strategy, and strengthen his defenses, our defensive capabilities might be an invitation to CBW use as the enemy would not seek casualties that might inflame public opinion, but instead would desire the immediate battlefield results CBW use would create for the defender.

Chemical weapons used on U.S. forces would force commanders to initiate time-consuming decontamination procedures. Even after decontamination, "outgassing" of residual agents on equipment would continue to pose hazards. An enemy would be tempted to use chemical weapons to degrade and slow U.S. operations in order to gain time to respond to U.S. maneuvers. In Desert Storm, our forces moved to fast for the Iraqis to respond. Had the Iraqis

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291 U.S. Army Chemical School, Summary Evaluation Report; for Combined Arms in a Nuclear/Chemical Environment Force Development Test and Experimentation-Phase I, March 1986, cited in Orton and Neumann, p. 66.

292 See LTC Arthur Keating, The Utility of Tactical Nuclear Weapons Following 1990 Conventional Forces in Europe Reduction Agreement, A study project submitted to the US Army War College, Carlisle Barracks PA, 1991, p. 10.

used chemical weapons, that lightening speed would have diminished dramatically. A study by the Office of the Secretary of Defense, concluded that forces in a chemical environment experience a decrement of "at least thirty to fifty percent...in operational effectiveness due to restrictions imposed by [chemical] protective equipment [suits] and procedures."[293]

While Secretary of Defense William Perry has stated that our "new [conventional] military capability can also serve as a credible deterrent to a regional power's use of chemical weapons,"[294] this seems to be a best case scenario that fails to take into account the "what ifs" and assumes rationality on the part of the opponent, something the Army's doctrinal manual cautioned one not to do. Tactical Nuclear Weapons are our **strongest** deterrent available to prevent regional use of WMD against U.S. contingency forces. President Bush, when faced with this actual scenario, chose wisely to emphasize U.S. tactical nuclear capabilities then deployed in the land, air, and sea forces of the United States military.[295]

WHY THE U.S. ARMY NEEDS TNWs

From a land forces perspective, the need for TNWs is clear: TNWs are necessary to deter the enemy from introducing WMD into the land battle. How that TNW might be delivered has not yet been discussed. "As a force that now has no organic nuclear capability, the Army must rely on Air Force...nuclear capabilities to deter regional threats from using weapons of mass destruction, and should it be necessary, to respond to regional use of these weapons."[296]
In determining whether or not the Army needs its own TNW capability, it is worth investigating why Army leaders believed that was the case back in the 1950s.

The Army and the Air Force had different priorities on the use of nuclear weapons and on the airframes that would deliver those weapons. To the Air Force, close air support (CAS) ran a

293 Richard L. Wagner and Theodore S. Gold, "Why We Can't Avoid Developing Chemical Weapons," Defense 82, July 1982. Cited in W. G. McMillan, Tactical Nuclear Technology in the NATO Context, Phase III - Vulnerability Assessment, A technical report prepared for the Director, Defense Nuclear Agency, Washington D.C., 30 September 1985, p. 69.
294 William J. Perry, "Desert Storm and Deterrence," Foreign Affairs, Vol. 70, No. 4, Fall 1991, p. 66.
295 See Bundy, p. 84. See also Mazaar and Lennon, p. 57.
296 HQDA, FM 100-5: Operations, 1993, p. 6-11.

distant third to control of the air and interdiction. The Army sought to develop its own surface to surface systems to ensure independence from the Air Force in time of need.[297] The Air Force was not eager to follow the recommendations of the VISTA report which called for tactical use of nuclear weapons delivered by specially designated wings of tactical fighter-bombers and tried to suppress the VISTA report, fearing competition with what it perceived as its primary mission, establishing control of the air.[298] According to Major Hess, "the Air Force say the initial battle of any future war as one for air superiority before the ground confrontation could begin."[299] Writing in 1986, Major Hess noted that not much had changed, the Air Force still acknowledged then that it would eliminate the enemy air threat before supporting ground operations.[300] In Desert Storm, Coalition forces were calling the shots and the air war preceded the ground war. The next conflict might not proceed so conveniently, and aircraft might not be readily available to perform Army missions in a conflict against a credible air threat.[301]

In general, missiles and artillery have a greater probability of success than do aircraft. "Bad weather, air defense activity, countermeasures, or lack of local air superiority may prevent effective use in sufficient quantity of precision-guided munitions, resulting in the need for one or more accurately placed TNWs."[302] The probability for penetration is higher for missiles and artillery than for air-delivered gravity bombs: missiles are more difficult to intercept, are less susceptible to weather, and do not have competing priorities such as counter-air campaigns.[303] Stealth aircraft give air-delivered gravity bombs a greater probability of reaching the target in the face of modern air defense systems, but then again, will they be available from the outset of the conflict? If stealth aircraft were given the mission of delivering all TNWs, NATO would have to rely completely on the United States Air Force to provide that service.

297 Elliot, p. 166.
298 Elliot, p. 176.
299 MAJ Hess, p. 61.
300 Ibid.
301 MAJ Cannon, p. 60.
302 Young, p. 233.
303 Hirshfeld, p. 103.

There are, however, practical advantages to relying on Air Force delivered TNWs, as opposed to an organic Army TNW capability. Relying on Air Force capabilities "would preclude the need for the Army to store, secure, transport, and fire TNW from relatively forward locations within striking range of enemy ground forces."[304] Some Army Officers don't see the departure of Army TNWs as such a great loss. "The fact that we don't have them [TNWs] in the Army is not a big deal anymore: the Air Force will come to duty when we call them [to deliver TNWs].[305] However, ground-based systems are: more survivable than dual-capable aircraft since they can be dispersed and hidden across the battlefield; more reliable in all weather conditions; are easily deployable, and offer great flexibility to the landforce commander, because each " missile system [ATACMS] represents a potential nuclear delivery system."[306]

The Army faces numerous threats throughout the world of the size that Iraq presented during Desert Storm. "More than a dozen developing nations have 1,000 or more main battle tanks, and a similar number possess ballistic missiles or have access for their development."[307] Our National Military Strategy is to be able to fight and win two nearly simultaneous major regional conflicts. According to Dr. Kissinger, if the United States had to fight Desert Storm over again today, and deal with a North Korean invasion, the basic 2 MRC scenario, it could not do the job with its conventional forces alone,[308] but perhaps it could with nuclear weapons. What should be remembered is that to field an army to fight one Major Regional Conflict (MRC) against Iraq, a U.S. Army Corps was pulled from its commitments in Europe to fight in Iraq. With such dramatic force changes a possibility, and with the BUR Army facing further cuts of ,[309] TNWs are a necessary firepower compensation for losses in manpower.

Just a few short years ago, Army leaders believed that "modern, short-range nuclear forces will be an essential element in maintaining deterrence, as well as in assuring the lethality

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304 LTC Skelton, p. 29.
305 Major General David E. White, US Army, remarks during a seminar at the Military Science Department, Southwest Missouri State University, Springfield MO, 27 April 1995.
306 Keating, p. 16.
307 See Headquarters, Department of the Army, Army Focus 90, p. 6, cited in LTC Skelton, p. 27.
308 Henry A. Kissinger, "The Balance of Power Restored," Rethinking America's Security, Eds. Graham Allison and Gregory Treverton, New York, W. W. Norton & Co., 1992, p. 240.
309 Secretary of Defense William Perry proposed cutting the Army to 475,000 by 1998, instead of 495,000 by 196. See Jim Tice, "More Reductions Loom As Drawdown Wraps Up," Army Times, 15 May 1995, p. 12.

of the future Army. The Army's nuclear capabilities will remain an irreplaceable link between conventional forces and U.S. intercontinental nuclear forces. To be credible, they must be visible and militarily effective in sufficient numbers.'[310]

If the United States Army is truly serious about fighting and winning two nearly simultaneous MRCs, then it needs a responsive and flexible TNW capability that will deter future threats from employing the "equalizers" that Dr. Gray spoke of. Air Force TNWs have the limitations associated with being an air-delivered system. Additionally, by putting a TNW capability back into the Army, wherever our Army is deployed, threat nations will have to assume that it has deployed with its TNW capability. By utilizing "mini-nukes," "micro-nukes," and "tiny-nukes" of low yield (.01, .1, and 1 kt respectively), we can deploy usable TNWs that can support tactical operations.

I propose that the ATACMS be made nuclear-capable - basically an ATACMS-N. Such a system would have the advantage of low collateral damage, small destructive radii, and greater flexibility in use, due to their smaller yields, which makes their release more likely than the lowest yield air-delivered B-61 nuclear gravity bomb with a yield of 5kt.[311] Congress authorized a study of this proposal in 1988.[312] The 115km plus range of the ATACMS could provide the Corps commander an operational level system that could be employed well back from the line of contact. Such a system would return a "timely, proportionate nuclear response [capability] to the LCC [land component commander].'[313]

The ATACMS-N, would, on the surface, resemble the ATACMS. This would create further doubt in the minds of the opponent force as they would be unable to tell how many TNWs were in theater. Further adding to the deception would be the fact that it is difficult to tell the difference between an ATACMS and the more common MLRS, so that for every MLRS and ATACMS system deployed, the shell game of which might be nuclear capable grows and makes it impossible for an opponent to target that TNW capability. Even if no ATACMS-N systems

310 Headquarters, Department of the Army, United States Army - A Strategic Force for the 1990s and Beyond
311 Sinai, p. 19A.
312 Kanter, p. 31.
313 CPT Daniel S. Roper, The Impact of the Presidential Nuclear Initiative on Deterrence and the United States Army, The Institute of Land Warfare, Association of the United States Army, Arlington VA, September 1993, p. 13.

were deployed in a crisis, the similar signature of the three systems would automatically create doubts in the minds of our opponents. In this way, the Army can have a visible, yet hard to find TNW capability that would deter enemy use of WMD and allow our forces to fight our doctrine, thereby preventing, as Dr. Gray said, the enemy from attacking our strategy.

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